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ECONOMIC INEQUALITY, POLICY AND PERFORMANCE IN THE FORMAL SECTORS OF ARGENTINA, BRAZIL, AND CHILE: EVIDENCE FROM REGIONAL AND SECTORAL DATA, 1994 TO 2007

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ECONOMIC INEQUALITY, POLICY AND PERFORMANCE IN THE FORMAL SECTORS OF ARGENTINA, BRAZIL, AND CHILE: EVIDENCE FROM REGIONAL AND SECTORAL DATA, 1994 TO 2007

by

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Dedication

During the course of preparing this dissertation, two very important people have gone from and come into my life, and it is to these two individuals to whom I would like to dedicate this work. The first is my grandmother Ana, known as "La Gringa," who is no longer with us. I will always remember my grandma because she gave me the possibility of experiencing that unique and special relationship between a grandmother and a granddaughter. She gave me unconditional love even when we did not live in the same city, or even in the same country: I always knew that despite the distance, our love was there.

The other person to whom I would like to dedicate this dissertation is my son-to-be, Noah. While we have not quite met in person, he has been with me during these critical months, motivating and inspiring me to finish this project - even if he was not always contributing to my energy levels.

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I thank the members of my committee, each of whom has contributed in his or her own way to make this project possible. I can not thank Peter Ward or Bryan Roberts without also thanking their wives, Victoria Rodriguez and Susan Roberts, both of whom have received me like family since I arrived in Texas. Bryan and Susan have shared from their wealth of knowledge of Latin America, and have repeatedly opened their home to me with warmth, conversation, good cheer and great food. I am grateful to Peter and Victoria for the instruction I received from both as a student and for their commitments to LBJ and the Graduate School. I thank Victoria for always being there for me in my moments of need.

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Finally, I want to dedicate this dissertation to all those persons who dedicate themselves, in one way or another, to fighting for a more just society.

Economic Inequality, Policy and Performance in the Formal Sectors of Argentina, Brazil, and Chile: Evidence from Regional and Sectoral Data, 1994 to 2007

Publication No._____

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This dissertation focuses on trends in pay inequality in the formal sectors of Argentina, Brazil, and Chile from the early 1990s into the latter part of the first decade of the new millennium. In-depth, single-country studies of inequality of each country of study seek to understand and explain the sources of movement in inequality in each country, relating changes in inequality to shifts in the relative roles of key economic sectors and geographic jurisdictions. In addition to these single-country studies of inequality, this dissertation develops a regional perspective on the dynamics of inequality by synthesizing findings from the three countries of study, identifying both commonalities and differences. This dissertation also evaluates the relationship between trends in inequality and the macroeconomic policies and factors that influence them. By eschewing the inequality of household incomes and focusing instead on measures of inequality

in the underlying distribution of pay, this dissertation presents empirical evidence that fluctuations in countries' inequality levels are intrinsically related to macroeconomic factors.

This dissertation applies Theil's T statistic, which belongs to the family of generalized entropy inequality measures, to develop new measures of economic inequality. The calculations presented in this dissertation are performed on data obtained from semi-aggregated datasets in which employment and average wage data organized by economic sectors and geographical jurisdictions, as derived from administrative records. Sectoral analysis shows that the changing levels of overall inequality are explained to a great extent by variations in the performance of a reduced number of "key" high-pay sectors, especially finance, extractive industry and civil service. In terms of the dynamics of geographic distribution, the role of these key sectors is observed in the driving role played by key geographic units: those composed of, or containing, the countries' main metropolitan centers, and those with high concentrations of economic activity in extractive industries.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

The Latin American region suffers from persistent inequality that traces back to its colonial heritage (De Ferranti, Perry *et al.* 2004): Latin American countries (LAC) have been characterized as some of the most unequal, if not the most unequal, in the world.[1] Making matters worse, inequality basically trended upwards in the second half of the twentieth century across the region. The countries of South America's "Southern Cone" were not immune to this trend: particularly, the literature on Argentina, Brazil and Chile points to clear inflection points at which inequality began to take off in all three countries: in Brazil in the 1960s (Ferreira and Barros 2000) and in the mid-1970s for Argentina (Altimir 1986; Beccaria and Orsatti 1986; Beccaria 1991) and Chile (Larrañaga 2001). The onset of these increasing trends "coincided" with periods of significant change in these three countries, including both political change - with military regimes assuming power in each country before eventual returns to democratic government – and economic transition - from the Industrialization via Import Substitution (ISI) model to economic liberalization. By the turn of the century, all three countries eventually endured some level of economic turmoil sparked by external shocks, including crises and recoveries of different magnitudes.[2]

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[1] As Gasparini, Cruces *et al.* (2008, p.12) note, "LAC countries are located among the most unequal economies both in terms of consumption and income." However, the authors note that inequality levels are as high if not higher in some Asian economies than the most unequal economies of Latin America and, on a regional level, there is some evidence that other regions, including Africa, may be even more unequal.

[2] The crises experienced by Brazil in 1999 and Argentina in 2001/02 are well known. Chile also went through a recession, in 1998-1999. After a period of high economic growth between 1985-

However, a remarkable reversal has been occurring in the countries of study (and in Latin America more generally) since the turn of the century: as this dissertation will show, Argentina, Brazil, and Chile have experienced different degrees of declining inequality during the first decade of the 2000s. Previous work performed at the University of Texas Inequality Project (UTIP, of which the author is a member), began to reveal this trend as early as 2006 (Galbraith, Spagnolo *et al.* 2007).[3] This same observation has appeared in the rest of the academic literature on Latin American inequality (Gasparini, Cruces *et al.* 2008; ECLAC 2010; López-Calva and Lustig 2010; Gasparini, Cruces *et al.* 2009; Cornia 2011).

The improvements in inequality in Latin American countries accompanied a period of growth stimulated, at least in part, by world economic growth. However, growth did not have the same impact on other emerging economies: despite also experiencing economic growth, many European transitional economies experienced steady increases in inequality between 2000 and 2008 (Cornia 2011).

Set against this background, study of the drivers of reducing inequality in Argentina, Brazil, and Chile in the last 10 years is particularly interesting, especially given that the regional tendency leading up to this period had been levels of inequality that were increasing, or, at best, holding steady.

A basic question arises: What can empirical evidence reveal about decreasing inequality in Argentina, Brazil, and Chile? Is it mere coincidence that

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and 1997, the Asian crisis and, to a lesser extent, the Russian crisis as well as the policy response to these shocks slowed Chilean growth considerably (Corbo and Tessada 2002).

[3] An earlier version of this paper was published as a UTIP Working Paper in 2006 (Galbraith, Spagnolo *et al.* 2006).

these three Southern Cone countries have experienced decreasing inequality in the last ten years, given that the countries of study entered the country period of study in vastly different situations? Important differences exist in the size and structure of the countries' economies, base levels and trajectory of inequality and poverty, macroeconomic stability, and economic growth.

Brazil is one of the 10 largest economies of the world. While Chile has the highest GDP per capita in all of Latin America, the economic output of Argentina and Chile do not approach that of Brazil. Brazil's stature is related to its immense size, but is also a reflection of how far its economy has come in the past decades.

Levels of inequality and poverty have historically differed greatly among countries. Argentina was historically the most egalitarian, with low poverty levels for the region. Brazil was historically the most unequal, with the most poverty, and Chile was in the middle. However, as will be shown in subsequent chapters, the trajectories of inequality and poverty were also different in the 1990s and 2000s: whereas in the 1990s income inequality increased at a higher rate in Argentina than in any other country in the Latin American region (Gasparini 1999), trends in Brazil and Chile were more moderately increasing, or flat. Similarly, both Brazil and Chile experienced decreasing poverty during both the 1990s and the first decade of the 2000s, while Argentina had increasing poverty during the 1990s and decreasing poverty in the 2000s. Another important difference in the countries of study at the turn of the century was in their respective levels of macroeconomic stability. Whereas Chile's economy was relatively stable by 2000, Brazil was just beginning to recover from its crisis, and Argentina was headed for its own. In the period of study, Argentina endured

two vastly different macroeconomic regimes: one during the Convertibility Plan (1991-2001) and another in the post-Convertibility period (2002 onwards).

Another interesting difference between the countries of study is the range in rates of growth experienced while their inequality levels were diminishing in the 2000s. While all three countries experienced gross domestic product (GDP) growth during the 2000s, the pace of growth was different in each of the three countries.

OBJECTIVES

This dissertation focuses on trends in pay inequality in Argentina, Brazil, and Chile from the early 1990s into the latter part of the first decade of the new millennium. In-depth, single country studies of inequality for each country of study seek to understand and explain the sources of movement in inequality in each country, relating changes in inequality to shifts in the relative roles of key economic sectors and geographic jurisdictions. Decomposition of a country's inequality into its sectoral and geographic components allows structural shifts to be revealed, allowing discussion of the underlying factors, whether they be changes in policy, external demand for domestic products, or the product of major events (e.g. crisis).

In addition to in-depth, single country studies of inequality, this dissertation develops a regional perspective on the dynamics of inequality by synthesizing findings from the three countries of study. By first understanding single-country trends, context can be provided to both the similarities and the differences in trends observed over the period of study.

POLICY IMPLICATIONS

Inequality is important in and of itself. From a policy perspective, high levels of inequality are undesirable. Broadly, policy makers in Latin America should seek to implement policies that can build on the advances of the last decade; however, choosing the appropriate course of action from among various alternatives depends on having a solid understanding of income inequality's root causes. To this end, researchers have analyzed inequality and its causes in the countries of study especially in the last twenty years, analyzing income inequality from a variety of different perspectives. Since the 1990s the application of "new" methodologies to more recently available datasets has allowed researchers to apply decomposition techniques to identify causes of change in inequality, bringing new insights. This dissertation seeks to add to this body of knowledge by applying Theil's T statistic,[4] which belongs to the family of generalized entropy inequality measures (Bourguignon 1979; Cowell 1980; Shorrocks 1980; Shorrocks 1984), to decompose pay inequality in each of the countries of study into sectoral and geographic contributions, providing a structural perspective on inequality changes. The approach being applied provides original empirical evidence: the ability to study the sectoral and geographic dimensions of inequality in the countries of study allows for a different interpretation of the drivers of economic inequality, which, in turn, may lead to different policy prescriptions to address inequality.[5]

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[4] Throughout this dissertation the terms "Theil's T statistic", "Theil's T" and "Theil" are used interchangeably.

[5] For a complete list of papers and books applying Theil's T statistic to semi-aggregated datasets organized by economic sector and/or geographic jurisdictions see Galbraith (2009, p.192).

Frequently distributional impacts of policy decisions take a back seat to other considerations in the formation of economic policy. As will be demonstrated in this dissertation, the historical record is clear: certain policies have benefitted certain economic sectors and geographic regions while working to the detriment of others. Studying inequality in this way reveals, to some extent, the priorities embedded in given policies.

DISSERTATION'S CONTRIBUTIONS

Why can this dissertation shed new light on inequality in Latin America, a subject that has drawn much academic attention in the last two decades? First, because UTIP members have advanced novel means of studying inequality that have provided a more structural perspective on the subject of inequality around the world. Second, to the extent these methods have been applied to Latin American countries, or specifically to the countries of study, their use has been limited to analyzing inequality in the manufacturing sector (Du Pin Calmon, Conceição *et al.* 1999; Du Pin Calmon, Conceição *et al.* 2000; Galbraith and Garza Cantú 1999; Adair 2006; Spagnolo and Munevar 2008). Third, this dissertation applies these methods to analyze the formal economies of the countries of study using data from administrative registries of the three countries that have not previously been utilized for this purpose.

RESEARCH QUESTIONS

Broadly, this dissertation seeks to present novel empirical evidence about the evolution of inequality in the last two decades in Argentina, Brazil, and Chile. Several calculations are performed, for each country, to estimate the extent to which changes in pay inequality are attributable to the changing fortunes of

specific economic sectors and/or geographical units (regions, states, provinces, or municipalities, depending on the country of study).

Specifically, this dissertation poses the following research questions and sub-questions:

1. How has pay inequality evolved in Argentina, Brazil and Chile since the beginning of the 1990s?
    a. How has it evolved by economic sector?
    b. How has it evolved by geographic jurisdictions?
2. What economic sectors and geographical jurisdictions drive the evolution of inequality in these countries?
    a. Which high-pay sectors and geographical units are driving changes in inequality? How do the contributions of low-pay sectors/geographical units evolve across the period?
    b. How do changes in relative wages and employment shares affect the relative contributions of individual sectors or geographical units?
    c. What kind of groupings of economic sectors can be formed to illuminate the extent to which changing fortunes in certain sectors drove changes in inequality across the period of study?
3. What do the trends from Argentina, Brazil and Chile have in common, and how do they differ?
    a. Are there universal patterns, in terms of the contributions of economic sectors or geographic units (e.g. the role of

metropolitan centers or geographic units with common characteristics)?

b. How can these similarities and differences be related to the similarities and differences in policies enacted by these countries?

c. Broadly, how did macroeconomic events at the local (country) and global level influence the changing sectoral and geographic composition of inequality observed in Argentina, Brazil, and Chile in the period of study?

Country-specific studies, as presented in chapters five through seven, address research questions one and two for each country, respectively. Research question three and its sub-questions are addressed in the integrative chapter.

METHODS AND DATA

This dissertation is particularly interested in the dynamics of inequality, and seeks to characterize it according to its group-wise (sectoral and geographic) composition. The fundamental method for decomposing inequality in the countries of study into its sectoral and geographic components is Theil's T statistic, estimated with data obtained from administrative registries of the respective countries.

Methods

The preferred inequality measure for this dissertation is Theil's T statistic, which offers important advantages over the measures of inequality most frequently encountered in the literature measures (e.g. the gini coefficient estimated with micro-data derived from household surveys). In particular,

Theil's T statistic is additively decomposable (in addition to satisfying all the properties of a good inequality measure, as discussed in detail in the methods chapter). Furthermore, Theil's T statistic does not require individual data for estimating inequality, so employing Theil's T statistic in this dissertation allows for the usage of semi-aggregated data. This facilitates the employment of innovative data sets, which have not been previously used for the purpose of estimating inequality.

Data

The calculations presented in this dissertation are performed on data obtained from semi-aggregated datasets in which employment and average wage data organized by economic sectors and geographical jurisdictions, as derived from administrative records. These data provide several key advantages over data from other sources. First, the data are highly reliable, as they come from administrative data sets rather than from household surveys, avoiding the problems associated with self-report data (as discussed in subsequent chapters of this dissertation). Second, these data are available on regular and frequent intervals (quarterly and, in some cases, even monthly). Third, these data provide coverage of rural and urban populations, though restricted to formally-employed, salaried workers. Finally, with specific respect to the purposes of this research, in some cases these data provide a finer disaggregation for both economic sectors and geographic units than is found in the respective countries' household surveys.

Argentina

For Argentina this dissertation employs wage and employment data derived from the administrative registry of the Argentine Integrated Pension System (Sistema Integrado Previsional Argentino, or SIPA), formerly known as SIJP. The SIPA data are compilations of the monthly tax filings of private and public entities, filed with the Federal Administration of Public Revenues (Administración Federal de Ingresos Públicos, or AFIP). Employers submit these filings to formally declare their employees, committing the payment of contributions to social security within the SIPA.

These data are categorized by geographical unit and by economic sector, providing sector cells for 21 economic sectors, geographic cells for 24 jurisdictions (23 provinces plus the Federal Capital, the City of Buenos Aires), and geographic-sector cells for 24 jurisdictions subdivided into 9 economic sectors. The obtained data are for the years from 1994 to 2007.

Brazil

For Brazil, data are derived from the Central Business Registry (Cadastro Central de Empresas, or CEMPRE), provided by the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica, or IBGE). The CEMPRE contains data for all legal enterprises and other formal organizations in Brazil. It is updated combining information from: (1) the Annual Report of Social Information (Relação Anual de Informações Sociais, or RAIS), (2) the General Register of Employment and Unemployment (Cadastro Geral de Empregados e Desempregados, or CAGED); (3) annual sample surveys conducted by IBGE in manufacturing, construction, trade and services and, to a limited extent (4) the National Register of Legal Entities (Cadastro Nacional da

Pessoa Juridica, or CNPJ) from the Ministry of Finance (Cardoso and Ribeiro 2008). The most important source of information used to update CEMPRE is the RAIS.

The Brazilian data are categorized by economic sector and geographical unit providing sector cells for 15 economic sectors, geographic cells for five regions, 27 jurisdictions (twenty-six states plus the Federal District), and 5,564 municipalities. Finally, geographic-sector cells are employed for both regions and the 27 jurisdictions subdivided into 15 economic sectors. The data are for the period between 1996 and 2007.

Chile

This dissertation employs for the Chilean case an administrative registry of the pension system provided by the Superintendency of Pension Fund Administrators (Superintendencia de Administradoras de Fondos de Pensiones, or SAFP).

The information comes from the Quarterly Statistical Report of participants and contributors in the SAFP, based on data provided by the Pension Fund Administrators (Administradoras de Fondos de Pensiones, or AFP). Within the universe of pension contributors, this dissertation considers only those workers that make payments into the AFP – the privatized system – and not those who continue to contribute to the public system (97.5 percent of salaried Chileans participate in the private system).

These data are categorized by economic sector and geographical unit, providing sector cells for 11 economic sectors between 1995 and the second quarter of 2006 and 19 economic sectors since the third quarter of 2006, and

geographic cells for 13 geographic jurisdictions (13 regions).[6] Finally, geographic-sector cells are available for these 13 regions subdivided into 11 or 19 economic sectors depending on the year. The obtained data are for the years from 1995 to 2010.

Table 1-1 presents an overview of estimates of pay inequality performed for each of the countries of study using Theil's T statistic as well as the sources used in each case. These sources, and the information taken from them, are discussed in detail in the Data chapter.

[6] Even though two new regions were added in 2007 -Los Ríos (XIV) and Arica-Parinacota (XV)- this dissertation treats Chile as though it had maintained the same 13 regions to keep regional consistency across the period of study.

Table 1-1. Overview of Estimates of Pay Inequality Performed Using Theil's T Statistic for This Dissertation

Country	Wage and Employment Data		Dates	Disaggregations	Source
Argentina	Geographic	Provinces (24)	1994-2007	Major Private Sectors	SIPA
	Economic Sectors	Major Private Sectors (9)	1994-2007		
		Letter-level CIIU (21)	1994-2007		
Brazil	Geographic	Regions (5)	1996-2007	High-level Sectors	CEMPRE
		States (27)	1996-2007	High-level Sectors	
		Municipalities (5,564)	1996-2007		
	Economic Sectors	High-level Sectors (15)	1996-2007		
Chile	Geographic	Regions (13)	1995 - 2010 (Q2)	High-level Sectors, Expanded High-level Sectors	SAFP
	Economic Sectors	High-level Sectors (11)	1995-2006 (Q2)		
		Expanded High-level Sectors (19)	2006 (Q3) - 2010 (Q2)		

DISSERTATION STRUCTURE

This dissertation is divided into eight chapters. This Introduction (1) is followed by a Literature Review (2), a-Methods chapter (3), a description of the Data (4) used for each country, followed by country case studies for each of the three countries of study: Argentina (5), Brazil (6), and Chile (7). The final chapter integrates and synthesizes the findings of the three country studies, presenting Integrated Analysis and Conclusions (8). The eight chapters are summarized as follows:

Chapter 2 sets the stage for the analysis, providing background on political and economic trends dating back to the 1960s from the countries of study as well as historical context to the evolution of the study of inequality in Argentina, Brazil, and Chile. In evaluating how the literature has evolved, Chapter 2 discusses the transition from studies of the functional distribution to the personal distribution, demonstrating how academic debates over the distribution of income in these countries has been shaped by the evolution of theory, historical context and the availability of information (data). It also discusses the two primary competing frameworks in the more recent academic literature on the determinants of inequality: those taking a microeconomic approach, and those with a more macroeconomic perspective.

Chapter 3 provides a general introduction to the primary method employed in this dissertation for analyzing inequality in the countries of study: Theil's T statistic, a generalized entropy measure that is additively decomposable. It describes the many advantages of this measure, particularly for accomplishing the objectives of this dissertation, rooted in its key property,

additive decomposability. Chapter 3 presents the computation of Theil's T statistic with individual data and expands from there to estimating Theil's T with grouped data, before describing the specific decompositions of grouped data performed for this dissertation, which make use of the between-groups component and the within-groups component of Theil's T statistic.

Chapter 4 describes in detail the data used to carry out this dissertation. It presents a careful description of each of the administrative data sets from Argentina, Brazil, and Chile used in this study, laying out the specific advantages and disadvantages of using administrative data sets for generating income statistics. It explains any adjustments made to the data sets to facilitate calculation and presentation of continuous data series. It also describes the main characteristics of the study population in the countries of study (formal, salaried employees), and provides the justification for focusing on this subset of the population, which does not include informal, salaried workers.

Chapter 5 presents the Argentina country study, beginning with an overview of the evolution of income inequality in Argentina calculated using household survey data from the early 1990s through the latter half of the first decade of the 2000s. The chapter presents a brief synopsis of the determinants of the observed trends as discussed in the literature, before turning to the application of Theil's T statistic to the employment and wage data to identify trends in Argentine pay inequality between economic sectors and geographic jurisdictions (specifically, provinces). Some preliminary conclusions are presented.

The Brazil country study presented in Chapter 6 begins with an overview of the evolution of income inequality in Brazil during the period of study, after which it presents two sections on the use of Theil's T statistic to identify trends in pay inequality. The first section focuses on the inequality between economic sectors, while the following section discusses trends in geographical inequality at three levels: between regions, states, and municipalities. Again, preliminary conclusions are presented.

Chapter 7, the country study on Chile, begins with an overview of the evolution of income inequality in Chile over the past 20 years as traditionally estimated with the gini coefficient, after which it presents two sections on the use of Theil's T statistic to identify trends in pay inequality. The first section focuses on the inequality between economic sectors, and the following section discusses trends in interregional inequality. As with the Argentina and Brazil country studies, preliminary conclusions are presented.

Finally, Chapter 8 presents an integrated look at the evolution of inequality in these three major economies of South America's southern cone, building upon the findings of chapters 5, 6 and 7. Chapter 8 concludes the analysis, discussing some of its limitations, laying out areas for future research, and presenting some policy recommendations based on its broad findings.

Having finalized presentation of the essential structure of the present study, the next three chapters present some preliminary elements before proceeding to the single-country studies. Specifically, a review of the relevant literature is presented, as is a detailed introduction to the dissertation's key analytical method and a discussion of the underlying data.

References

Adair, Craig. 2006. "Structural Change, Inequality, and Growth in Mexico." UTIP Working Paper No. 35, The University of Texas, Austin, Texas.

Altimir, Oscar. 1986. "Estimaciones de la Distribución del Ingreso en la Argentina, 1953-1980." *Desarrollo Económico* 25(100):521-566.

Beccaria, Luis. 1991. "Distribución del Ingreso en la Argentina: Explorando lo sucedido desde mediados de los setenta." *Desarrollo Económico* 31(123):319-338.

Beccaria, Luis and Alvaro Orsatti. 1986. "La Distribución Personal del Ingreso en el Gran Buenos Aires en el período 1974-1983." CEPAL Working Paper No. 23, Comisión Económica para América Latina y el Caribe, Buenos Aires, Argentina.

Bourguignon, François. 1979. "Decomposable Income Inequality Measures." *Econometrica* 47(4):901-920.

Cardoso, Sidnéia Reis and Ana Rosa Pais Ribeiro. 2008. "The use of administrative data for the production of official economic statistics in Brazil: current situation and challenges for the future." in *International Association for Official Statistics Conference on Reshaping Official Statistics*. Shanghai, China.

Corbo, Vittorio and José A. Tessada. 2002. "Growth and Adjustment in Chile: A Look at the 1990s." in *Economic Growth: Sources, Trends, and Cycles*, edited by L. Norman and S. Raimundo. Santiago, Chile: Central Bank of Chile.

Cornia, Giovanni Andrea. 2011. "Economic Integration, Inequality and Growth: Latin America vs. the European economies in transition." DESA Working Paper No. 101, United Nations Department of Economic and Social Affairs.

Cowell, Frank A. 1980. "On the Structure of Additive Inequality Measures." *The Review of Economic Studies* 47(3):521-531.

De Ferranti, David, Guillermo E. Perry, Francisco Ferreira, and Michael Walton. 2004. "Inequality in Latin America: Breaking with History?", The World Bank, Washington, D.C.

Du Pin Calmon, Paulo, Pedro Conceição, and James K. Galbraith. 1999. "Inequality and Industrial Wage Change in Brazil." UTIP Working Paper No.12, University of Texas, Austin, Texas.

Du Pin Calmon, Paulo, Pedro Conceição, James K. Galbraith, Vidal Garza Cantú, and Abel Hibert. 2000. "The Evolution of Industrial Earnings Inequality in Mexico and Brazil." *Review of development economics* 4(2):194-203.

ECLAC. 2010. "Time for Equality. Closing gaps, Opening trails." Economic Commission for Latin America and the Caribbean, Santiago, Chile.

Ferreira, Francisco H.G. and Ricardo Barros. 2000. "Education and Income Distribution in Urban Brazil, 1976-1996." *CEPAL Review* 71:41-61.

Galbraith, James K. 2009. "Inequality, Unemployment and Growth: New Measures for Old Controversies." *Journal of Economic Inequality* 7(2):189-206.

Galbraith, James K. and Vidal Garza Cantú. 1999. "Grading the Performance of the Latin American Regimes 1970-1995." UTIP Working Paper No.10, The University of Texas, Austin, Texas.

Galbraith, James K., Laura Spagnolo, and Sergio Pinto. 2007. "Economic Inequality and Political Power: A Comparative Analysis of Argentina and Brazil." *Business and Politics* 9(1).

Galbraith, James, Laura Spagnolo, and Sergio Pinto. 2006. "The Decline of Pay Inequality in Argentina and Brazil following the Crises and Retreat from the Neo-liberal Model." UTIP Working Paper No. 34, The University of Texas, Austin, Texas.

Gasparini, Leonardo. 1999. "Un Análisis de la Distribución del Ingreso en la Argentina sobre la base de Descomposiciones." in *La Distribución del Ingreso en la Argentina*. Buenos Aires: Fundación de Investigaciones Económicas Latinoamericanas.

Gasparini, Leonardo, Guillermo Cruces, and Leopoldo Tornarolli. 2008. "Is Income Inequality in Latin America Falling?" in *XLIII Asociación Argentina de Economía Política*. Córdoba, Argentina.

—. 2009. "Recent trends in income inequality in Latin America." ECINEQ Working Paper No. 132.

Larrañaga, Osvaldo. 2001. "Distribución de Ingresos en Chile: 1958-2001." Working Paper No.178, Departamento de Economía, Universidad de Chile, Santiago, Chile.

López-Calva, Luis Felipe and Nora Lustig. 2010. "Declining Inequality in Latin America: A Decade of Progress?": Brookings Institution Press.

Shorrocks, Anthony F. 1980. "The Class of Additively Decomposable Inequality Measures." *Econometrica* 48(3):613-625.

—. 1984. "Inequality Decomposition by Population Subgroups." *Econometrica* 52(6):1369-1385.

Spagnolo, Laura and Daniel Munevar. 2008. "After Years of (Economic) Solitude: Neoliberal Reforms and Trends in Manufacturing Sector Pay Inequality in Colombia." UTIP Working Paper No. 47, The University of Texas, Austin, Texas.

UTIP. "University of Texas Inequality Project" Available at: http://utip.gov.utexas.edu.

Chapter 2: Context and Literature Review

The past 50 years in the history of Argentina, Brazil, and Chile, have been a dynamic period, marked by a number of significant political, social, and economic transitions. The first section of this chapter provides a brief review of the relationship between trends in inequality and the key political and economic changes that occurred. Subsequently, in evaluating how the literature on income distribution has evolved, the chapter discusses the transition from studies of the functional distribution to the personal distribution of income, demonstrating how the academic debate over distributional changes in Argentina, Brazil and Chile has been shaped by the evolution of theory, historical context and the availability of information. This discussion yields to a review of the determinants of economic inequality, as presented in the economic literature on Latin American inequality. Finally, the methods employed to identify these determinants are discussed, as are the sources of data that are usually employed for analyzing Latin American inequality.

POLITICAL AND ECONOMIC CONTEXT, 1970S THROUGH 2000S

The research presented in this dissertation focuses on trends in pay inequality in Argentina, Brazil, and Chile since the early to mid-1990s, the time by which the economies of South America had completed transformations to market-based economies. These transformations began in the 1970s under the military regimes ruling these countries during this period.[7] For all three

[7] The military dictatorships in the three countries of study did not exactly coincide: the Argentinean military dictatorship was from 1976 to 1983, while the Brazilian dictatorship lasted from 1964 to 1985, and that of Chile from 1973 to 1990.

countries, severe shifts in the patterns of economic development were introduced in the seventies, signaling a strong modification in the accumulation regime, a progressive weakening of the role of the State, opening of the economies, and strong integration into world markets.

In Chile, this was a continuous process under Pinochet, who ruled from 1973 to 1990.[8] In both Argentina and Brazil, this process was initiated in the 1970s under the military regime, interrupted in the 1980s with the return to democracy, but somewhat surprisingly taken back up by democratic governments beginning in 1989 immediately after the elections of Carlos Menem in Argentina and Fernando Collor de Mello in Brazil.[9]

During the 1970s, the Industrialization via Import Substitution (ISI) model –the economic development model all three countries had implemented, though with some variation - was becoming increasingly untenable due to the overvalued exchange rates, large deficits in the balance of payments, and large fiscal deficits that the model required. Also, there were significant changes occurring in international markets that further complicated the economic situation of these Southern Cone countries. The Bretton Woods agreement was abandoned in 1971, resulting in a fluctuating dollar and volatility in the financial markets. Whereas cheap capital had been available in the early 1970s, by the end of the decade interest rates were soaring, with an ultimately devastating effect on Latin American debt.

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[8] Larraín Bascuñán and Vergara (2001) provide an excellent source for detailed review of the economic and social reforms implemented in Chile since the second half of the 1970s.

[9] See the first section of Frenkel and González Rozada (2000), which presents the most important aspects of the macroeconomic configuration in Argentina during the 1980s and 1990s.

The 1980s would come to be known as the "lost decade" for Latin America: the decade was marked by external debt, fiscal deficit, and high inflation. Mexico defaulted in 1982, followed by a moratorium on Brazil's debt in 1987. Due to the debt crisis, in the 1980s the countries of study attempted to implement stabilization programs, including such actions as restrictive monetary and fiscal policies in Chile ("orthodox" adjustment), and combinations of price and wage controls with a controlled exchange rate in Argentina and Brazil ("heterodox" adjustment). However, by the end of the 1980s, these stabilization adjustments had failed in most countries, leading to increased pressure from international creditors (particularly the US) to move economies to a more market-oriented approach. In the 1990s Argentina and Brazil finished the neoliberal reforms begun in the 1970s, now following the recommendations of the Washington Consensus - which broadly consisted of trade and financial sector liberalization, opening of capital markets, deregulation of labor markets, and tax reform and privatization (Williamson 1990). While Argentina, Brazil and Chile all implemented many core elements of the Washington Consensus, the nature and extent of the market reforms implemented varied significantly across the three countries (Morley, Machado *et al.* 1999; Lora 2001).

Unsurprisingly, changes in the accumulation regime provoked changes in the distribution of income in the countries of study, Larrañaga (2001) documents this rise in Chile, demonstrating an inflection point in 1974, when the Pinochet regime replaced the government of Salvador Allende; many authors (Altimir 1986; Beccaria and Orsatti 1986; Beccaria 1991), agree that Argentinean inequality also took off in the mid-1970s under the military junta; the spike in Brazil

actually began in the previous decade, also following the arrival of military rule (Ferreira and Barros 2000). From the 1970s through the end of the century, inequality generally increased, with brief periods of relative stability interspersed. Thirty years of increasing inequality have been followed by a moderate reversal; beginning in the early 2000s, a declining trend has emerged in Argentina, Brazil and Chile (Gasparini, Cruces *et al.* 2008; Gasparini, Cruces *et al.* 2009; López-Calva and Lustig 2010; ECLAC 2010; Cornia 2011). As stated in (ECLAC 2010, p.172):

> Between 1990 and 2002, income distribution remained very rigid in the region after rising in the 1980s. The period 2003-2008, by contrast, was characterized not only by sustained economic growth but also by a slight but clear trend towards a lesser concentration of income. The Gini index fell by 5% from its 2002 level for the region as a whole, driven in particular by reductions in Argentina (metropolitan areas), the Bolivarian Republic of Venezuela, Panama (urban areas) and the Plurinational State of Bolivia (urban areas), all of which recorded declines exceeding 10%. Brazil, Chile, Ecuador (urban areas), Nicaragua and Paraguay (metropolitan areas) also saw significant reductions of 7% or more in this indicator.

The declining trend in inequality over the last decade has also coincided with another historic period of economic and political change: retreat from neoliberalism and election of governments that, broadly, can be characterized as pertaining to the political left. Noting this coincidence, Lustig (2009) and Lustig and McLeod (2009) studied the relationship between inequality and political regimes in 17 Latin American countries from 1998 to 2006, concluding that inequality decreased faster in leftist regimes. After controlling for the coincident boom in commodity prices, the authors specifically found that "social democratic

regimes" (Brazil, Chile, and Uruguay, in their analysis) had the greatest impact in reducing inequality.

BASE INEQUALITY AND TRAJECTORIES IN THE 1990S AND 2000S

Within a continent known for high levels of inequality, Brazil has been recognized as having a particularly high level; historically, Argentina was at the other end of the spectrum, and Chile was in between. While Argentina was generally one of the more egalitarian economies of Latin America, this status has eroded, primarily due to changes that took place in the 1990s, when inequality grew at an unprecedented rate, while the changes that took place in Brazil and Chile were more moderate (Gasparini and Cruces 2008). By the end of the century, the gap between Argentina and Brazil and Chile had greatly reduced. Since the early 2000s, there have been significant reductions in inequality in all three countries, such that levels relative to each other are maintained: Argentine inequality remains lowest, followed by Chile, and Brazil.

Studies of Income Distribution: From Functional to Personal Distribution

Analysis of the literature on income distribution in Argentina, Brazil and Chile demonstrates how the intimate connection between theory, historical context and the availability of information have shaped the path of intellectual inquiry on which the debate over the distribution of income in these countries is founded. In the 40 to 50 years of study dating back to the 1960s, the two primary means by which income distribution has been discussed in the economic literature of these countries are the functional and the personal distribution.[10]

[10] Scholars study mainly four types of income distribution: (1) functional distribution, (2) personal distribution, (3) distribution by (economic) sector, and (4) distribution by region or

The functional distribution measures the proportion of total income that is apportioned to the various factors involved in the productive process – wages, rents, interest and profit. It is employed by researchers interested in demonstrating how total (national) income is distributed between laborers and capitalists whereas researchers prefer the personal distribution to analyze how income is distributed among people (individuals or households), with less regard to its source. In the literature, studies of the functional distribution precede those of the personal distribution.

Larrañaga and Vega Fernández (2000) provide a detailed explanation of why the functional distribution precedes the personal distribution in the arc of thinking on economic literature. In short, studies of the functional distribution follow directly from the classical economic division of the factors of production: capital, rents, and labor. With the rise of neoclassical economics, theories of income distribution were relegated to a position of lesser importance, essentially becoming a subdiscipline of labor economics, in which the focus shifted to the personal distribution.

This transition is also reflected in the Latin-American literature on income distribution. During the 1960s and 1970s, the most studied distribution was the functional distribution; however, since the 1980s, studies based on the personal distribution have come to dominate the literature. In the last few years the functional distribution has reappeared, particularly in the Argentine academic literature, where some studies have been presented arguing its importance. Various authors point out both how it is quite different from, and how it can

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territorial divisions (e.g. states, provinces). A fifth type of distribution is emerging with the incorporation of recent efforts to characterize distribution by gender into the body of literature.

complement, the personal distribution (Larrañaga and Vega Fernández 2000; Graña, Kennedy *et al.* 2005; Lindenboim, Graña *et al.* 2005; Lindenboim 2008).

Functional Distribution: historical context and availability of information

In the period from the 1950s through the 1960s and into the early 1970s,[11] when inequality studies focused on the functional distribution, the economies of the countries of study had five essential characteristics: (1) consolidation of the industrialization by import substitution model (2) vigorous enlargement of the State apparatus, (3) expansion of the manufacturing sector as reflected in increasing contributions to countries' GDPs, (4) urban growth, and (5) strong growth in organization among the working class with support from the State. The historical context clearly framed the debate on income distribution concentrating in the functional distribution: studies concentrated exclusively on discussions of the share of total income accruing to wage earners as compared to the other factors of production (Monza 1973; Diéguez and Petrecolla 1974; De Pablo 1977; Orsatti 1983), among others. In general, labor income as a share of total income was at its highest in the countries of study at the peak when the ISI model was in place. With the opening of economies and change in economic model, the share of total income appropriated by labor has decreased.

The availability of data was another reason why the studies of this period focused on the functional distribution. Studies of the functional distribution of income were based on national accounts data. In Argentina, the Central Bank began publishing these data in the 1950s (BCRA 1975) with information for the

[11] The exact timing of transitions from one economic model to the other in the countries of study is different – in this case, Brazil began its departure from ISI, and the characteristics described, prior to the 1970s.

period 1950-1973. In Chile, data were published by the Office of National Planning's Department of Social Accounts, ODEPLAN[12], the predecessor of today's MIDEPLAN[13] (Gavan 1968; Passicot Callier 1969).

Personal Distribution: historical context and availability of information

With the arrival of the military dictatorships in each of the countries of study,[14] the economic cycle tended to shift, as they proposed different strategies for each of the essential characteristics of the ISI model. This produced a significant break: a progressive weakening of the role of the State, indiscriminate opening of the economy, reforms to the financial sector, and a strong change in the structure of the accumulation regime. These changes brought a diminished role for the manufacturing sectors, growing importance of the services sectors, and greater integration into world markets. It was the end of the model of development centered around the State, with industrialization via import substitution. From this point forward, inequality would increase and the debate would be framed in different terms: studies began to concentrate on the personal distribution of income.

As pointed out by Larrañaga and Vega Fernández (2000) where the units of analysis in studies of the functional distribution are the factors of production and the objective is to measure how income is distributed among these factors

[12] Office of National Planning (Oficina de Planificación Nacional, or ODEPLAN).

[13] Ministry of Planning and Cooperation (Ministerio de Planificación y Cooperación, or MIDEPLAN).

[14] Paradoxically, in Argentina and Brazil, it was democratically-elected governments that completed the unfinished work of the military juntas: opening of markets, de-industrialization, privatizations, and deregulation – in short, a dismantling of the State apparatus at the mantle of unfettered markets, with little or no attention to providing the necessary safety nets that might have reduced the negative impacts and allowed for longer-term sustainability of the model.

(with a particular focus on the share of total income captured by wage earners), with the personal distribution the unit of analysis is the individual or the household. Individual or household income can be derived from various sources, including any of the factors of production. Researchers working with the personal distribution typically compute one or more of a standard set of indices, such as the gini coefficient, the Theil index or the Atkinson index, among others. They also present simple measures of inequality such as the income shares of each decile (or quintile)[15] or income ratios. These measures are typically computed over the distribution of household per capita income.

In terms of the availability of data, the shift in focus from the functional distribution to the personal distribution was facilitated by the emergence of government surveys producing the micro-data necessary to begin estimating personal distributions. Given that the studies on the functional distribution looked at aggregate values – the share of income appropriated by the different factors of production – aggregated data were sufficient. The personal distribution requires microdata, which became available in the 1970s; however, as pointed out by Gasparini, Cruces *et al.* (2008, p.3), only by the early 1990s had the majority of Latin American countries solidified their national household surveys:

> …systematic data on the personal income distribution only became available in the 1970s, when several countries in the region introduced household survey programs. However, the information for the 1970s and the 1980s is relatively weak, since surveys were infrequent, were usually

[15] Typically, estimates are presented of the percentage of income that corresponds to different economic strata according to an arbitrary division (e.g. quintiles or deciles), in which each stratum has the same population. Groups are ordered by increasing income (e.g. the first decile corresponds to the lowest-income stratum, and the tenth decile to the highest income).

restricted to main cities, included limited questions about income, and the questionnaires and sampling frames changed over time.

DETERMINANTS

Given the above-mentioned development of new data and also in part due to the application of "new" methodologies, especially since the 1990s, authors studying issues of income distribution have been working to exploit these sources to provide empirical evidence not only on the evolution of inequality (e.g. levels), but also to identify the determinants of these trends.

Comparative studies – whether they be studies including only Argentina, Brazil, and Chile, or the majority of the countries of Latin America - are particularly scarce: in the literature on this subject, the vast majority of studies are single single-country studies. The comparative studies that do exist generally look broadly at the entire Latin American region. They have the advantage of presenting the big picture of what happened in Latin America as a whole; however, given the heterogeneity of the countries that make up the region, their conclusions are generally broad, and may lack the depth to fully represent the situation of a single country.

For this reason, this chapter briefly presents the main arguments presented by researchers attempting to explain changes in inequality in Latin America as a whole. The literature on the evolution of income inequality and its determinants for each of the countries of study is presented in its respective country case study chapter. For the Argentine and Chilean cases, this includes the inequality indicators calculated by the Center for Distributional, Labor and Social Studies (Centro de Estudios Distributivos Laborales y Sociales, or CEDLAS), which are calculated using microdata from each country's household

surveys, as published in the Socio-Economic Database for Latin America and the Caribbean (Base de Datos Socioeconómicos para América Latina y El Caribe, or SEDLAC).

The literature on changing inequality in Latin America in the last 20 years has sought to explain the changes in inequality in Latin America that have accompanied the abandonment of the ISI model in favor of more open markets and integration into the world economy.[16] These studies have primarily evaluated the impacts of economic liberalization. They are centered around the performance of the labor markets in Latin America, concentrating on the impacts of certain policies on labor income (wage) differentials.[17]

Through these studies, increasing returns to education and/or skill have been observed across the Latin American region, especially in the 1990s.[18] Two opposing approaches can be taken to explain this phenomenon: it has been viewed as a function of changes in the demand for labor (particularly for skilled labor), or as a function of changes in the labor supply. The bulk of studies take the demand-driven perspective (Behrman, Birdsall *et al.* 2001; Behrman, Birdsall *et al.* 2003; Sánchez-Páramo and Schady 2003; Gasparini, Cruces *et al.* 2008): these authors suggest that an increase in demand for workers with high levels of

[16] The literature review for each country of study is presented at the beginning of each country's respective case study chapter (chapters five through seven).

[17] Authors writing about each particular country have also studied mainly the effect of trade liberalization and/or the liberalization of capital accounts in inequality: authors writing about Argentina (Cicowiez 2002; Galiani and Sanguinetti 2003; Porto 2006; Galiani and Porto 2010; Gasparini 2003; Acosta and Gasparini 2007); Brazil (Pavcnik, Blom *et al.* 2004; Ferreira, Leite *et al.* 2007); and Chile (Bravo and Marinovic 1997; Robbins 1994).

[18] Chile is a special case, in that, the observed increases in relative salaries of skilled labor happened earlier than in the rest of Latin America. This is explained because unlike Argentina and Brazil, market-oriented reform was an uninterrupted process in Chile, implemented by the military government that assumed power in 1973 and remained in power until 1990.

education explains the observed increase in returns to skill. They theorize that this incremental demand (at least initially) exceeded the increments in supply, producing greater returns to education and thereby increasing the difference in the wages earned by skilled and unskilled workers.

However, among these demand-side adherents, there are competing theories as to what brought about the observed increasing returns to skill. Behrman, Birdsall *et al.* (2001) analyzed the impacts of financial and trade liberalization and came to the conclusion that the financial liberalization had a significant impact on inequality and poverty in the region, but found no distinguishable effects associated with trade liberalization. In 2003, these same authors returned to the subject, broadening their analysis to include the effects of domestic financial market reform, capital account liberalization, tax reform, privatization, and trade liberalization. They again found no impact on inequality associated with trade liberalization, but found strong effects associated with domestic financial market reform, capital account liberalization, and tax reform. According to their analysis, privatization worked counter to the overall outcome: privatizations had helped reduce inequality. They concluded that technological progress resulting from the liberalization of capital accounts, rather than trade flows, was a channel through which policy changes were affecting inequality.

Other authors did find that expanded international trade had an important role in driving increasing returns to skill. Sánchez-Páramo and Schady (2003) observed that increases in the relative wages of the most skilled (university-educated) workers took place at the same time as there were increases in their relative abundance. Furthermore, they found that not only did

wage increases among skilled workers occur largely within sectors, they occurred in the same sectors in different countries. These authors took these observations as strong evidence that skill-biased technological change was occurring: counter to the findings of Behrman, Birdsall *et al.* (2001, 2003), their inferred that skill-biased technological change could be transferred through trade.

Adherents to this demand-side approach prescribe increased investment in education to address the problems introduced by trade liberalization and "skill-biased" technological change. They argue that education has been a primary determinant of the distribution of income due to the increase they observe in the difference between levels of remuneration among workers of different education levels.

Other scholars, approaching the problem from a different perspective, argue that increasing the supply of skilled labor in Latin America cannot address inequality before other conditions are met. As asserted by Ganuza and Taylor (1998, p.3):

> …increased investment in human capital (more schooling, better health provision, etc.) will infallibly be associated with faster income growth and reductions in poverty only when an economy's labor force is nearly fully employed. If there are output and employment shortfalls, better levels of human capital overall will not benefit the segments of the population that are unemployed or forced into jobs (or subsistence strategies) beneath their skill levels.

The idea of skill-biased technological change and associated theories attempting to explain increasing inequality as a function of unmet demand for skilled labor driving increasing wage differentials in the 1990s have held much

sway in both academic and policy circles. However, some authors (Maurizio 2001; Groisman 2003; Beccaria, Maurizio *et al.* 2006) writing specifically about Argentina, posit that Argentinean workers may actually have been "over-educated" in the 1990s. They argue that, far from there having been an excess demand for skilled labor, the Argentine economy suffered from an excess supply of skilled labor that led many individuals to take jobs for which they were overqualified. Seen from the perspective of these authors, the observed skill premium in a context of an insufficient demand for workers can be explained by the fact that an "overeducated" person always has the option to take a job beneath his or her skill level: while this would seem to exert a downward pressure on returns to skill, the overeducated worker with a job remains significantly better off than the less educated worker he or she has displaced. Beccaria, Maurizio *et al.* (2006, p. 5) summarize the position thusly:

> …it can be argued that in a context of low dynamism in demand for labor, markets become more competitive due to the lack of opportunities, which leads more educated individuals to compete for and obtain positions that require education levels beneath the levels they possess (The "Job Competition Hypothesis"). This generates a devaluation of education – and, as such, an over-educated work force – through the progressive incorporation of workers with qualifications in positions of lesser requirements (author's translation).

Authors writing from this perspective have concluded that it is the excess supply of qualified workers, rather than the demand for them, which explains the growing level of education of the employed work force.

Bringing evidence from the US, Galbraith (1998) has also criticized the demand-side approach for explaining increases in inequality. Galbraith demonstrates that inequality began increasing in the United States prior to the

major technological revolution of recent history – the introduction of the personal computer. Furthermore, he provides evidence of wage deterioration in sectors not affected by technological change. For Galbraith, the causes of rising inequality are mainly macroeconomic: he challenges the role of technology in introducing wage inequality through skill bias in a number of contexts, asserting instead that the deterioration in the structure of wages – a result of the implementation of bad macroeconomic policies – has driven increases in inequality.

METHODS

Even though the profound shift in the distribution of income began in the 1970s, very little attention was paid to the subject in the academic literature of that time, at least in part due to a lack of available information.[19] The academic literature on the subject of economic inequality in the Southern Cone began timidly in the 1980s, but grew substantially during the 1990s and into this century, in concert with the increased attention to this subject worldwide.[20] The early literature focused on documenting the trends and explaining the evolution of inequality in the countries of study. More recently, authors have been working to identify the determinants of these trends, applying different methodologies.

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[19] Argentina was the first of the countries of study to implement its Permanent Household Survey (Encuesta Permanente de Hogares, or EPH), which it began in the early 1970s. Brazil followed with its Brazilian National Household Surveys (Pesquisa Nacional por Amostra de Domicílios, or PNAD), and Chile did not begin its regular national household survey (Encuesta de Caracterización Socioeconómica Nacional, or CASEN), until 1985. These surveys would become the primary sources of information for the majority of investigations of income distribution.

[20] The return to prominence of the subject of inequality has been a worldwide phenomenon; see (Atkinson 1997; Kanbur and Lustig 1999).

One of the main methodologies used to analyze distributional changes found in the literature relies on microeconometric decomposition techniques (Ferreira and Barros 2000; Altimir, Beccaria *et al.* 2001[21]; Gasparini, Marchionni *et al.* 2005; González-Rozada and Menendez 2006; Bravo, Contreras *et al.* 2002). These studies of inequality have been applying the techniques proposed by (Bourguignon, Ferreira *et al.* 1998; Bourguignon, Fournier *et al.* 1998; Bourguignon, Ferreira *et al.* 2005) to identify factors causing changes in inequality. In some studies, changes have been introduced to apply the methodology to markets that are not clearing. As stated by González-Rozada and Menendez (2006, p.110):

> …our microsimulation approach builds on previous methods for decomposing changes in the distribution of individual earnings and poverty, such as that proposed by Bourguignon, Ferreira, and Lustig (2005) as a way to decompose changes in observed inequality. However, our approach departs from this literature in that it is specifically designed to apply in markets that are not clearing. All previous methods used to decompose changes in inequality have been developed for markets that are in equilibrium and, in particular, for labor markets that are at full employment. That is, they could not explore the association between unemployment—an important problem in many Latin American countries—and income inequality or poverty.

Other authors have been performing microeconometric decompositions based on the theoretical work of Juhn, Murphy, and Pierce (1993). Particularly, authors studying inequality in Brazil have applied this method by itself and also

[21] The authors applied two methodologies: aggregated decomposition and microsimulations.

in conjuction with quantile regressions (Sotomayor 2004; Monsueto, Machado *et al*. 2006; Alejo 2006).[22]

Finally, Contreras and Gallegos (2007) performed yet another decomposition, based on a model developed by Fields (2002), concluding that education is far and away the most important factor explaining wage dispersion in Latin America.

DATA USED IN COMPARATIVE STUDIES ON LATIN AMERICAN INEQUALITY

Four options exist for obtaining income data for estimating Latin American inequality: (1) World-wide compilations of secondary data, (2) Compilations specifically of data for Latin America, (3) Households Surveys, or (4) Administrative data sets. The first three of these are the most commonly-used sources and are described below: the fourth, administrative data sets, are the class of data used for this dissertation, and are discussed at length in Chapter 4.

(1) World-wide compilations of secondary data

Worldwide compilations, like the work of Deininger and Squire, or that of the researchers at the UN-WIDER[23] project, make significant amounts of data available. However, cross-country comparisons of inequality using these indicators are highly unreliable, for a number of reasons, as acknowledged by (Deininger and Squire 1996, p.571):

> First, the documentation in secondary sources is often very weak or totally absent, thus forcing the reader to make guesses concerning coverage,

[22] This study endeavors to interpret the changes in wage inequality in Greater Buenos Aires for the period from 1995 to 2003. It uses micro-decompositions in the vein of Juhn, Murphy and Pierce (1993) but using quantiles to estimate the regression parameters.

[23] United Nations -World Institute for Development Economics Research (UN-WIDER).

> definitions of income, or units of measurement. Second, a good proportion of Gini coefficients of very doubtful quality continue to be passed down from generation to generation (with each author quoting only the immediate predecessor) without satisfying minimum criteria for quality. In view of these problems, it was necessary to go back to primary sources wherever possible to be able even to decide on the quality of an observation.

General problems

Atkinson and Brandolini (2001), Pyatt (2003), Galbraith (2009) provide significant evidence as to the limitations of these data sets. Atkinson and Brandolini (2001) point out that one of the major problems with these data is the disparate variety of sources from which inequality information is obtained. They point out 6 different source types, ranging from calculations based on national micro-data sets to summary statistics obtained from another secondary data set. The fundamental problems are the use of different methodologies and the lack of documentation regarding the methods applied in obtaining the data or computing the inequality indicator(s).

Furthermore, there are intrinsic problems associated with comparing inequality indicators based on household surveys, which are the main source of data compiled in the worldwide data sets. Household surveys differ in their methodology and the type of data collected. The first difference is that some surveys choose to measure income as the primary indicator of welfare, while others measure expenditures (consumption). Where income is the chosen indicator, there are important differences in the coverage obtained, ranging from labor income only to the inclusion of capital and property rents, and also the significant differences in how taxes are treated: whereas some surveys provide

gross (pre-tax) income, others surveys reference net or disposable income (post-tax).

Problems specific to using these data for inequality studies in Latin America

The Deininger and Squire database (1996) presents two fundamental problems for performing a longitudinal analysis of inequality in Latin America. First, many countries were excluded because their surveys were not considered nationally representative, one of three requirements to be included in the data set.[24] The authors' state:

> …we discarded a large number of observations from Latin American countries - Argentina, Bolivia, Colombia, Ecuador, El Salvador, Paraguay, and Uruguay - where many household surveys have been limited to metropolitan or urban areas (Deininger and Squire 1996, p. 569).

Second, for those 20 countries that were included, there were a total of 100 observations over a forty-year period, an average of about 4 observations per country, or 1 observation for every 10 years. Furthermore, within these 20 countries, the number of observations per country varied greatly; the gini coefficient for Brazil is estimated for 15 different years, while that of other countries, such as Bolivia and Nicaragua, is estimated for only one year. Improving on the 1996 Deininger and Squire data set, The UNU-WIDER[25] published in 2000 the World Income Inequality Database (WIID1) with information on inequality (gini coefficient) for developed, developing, and transition countries. However, in response to criticism of various elements of

[24] The other two requirements established by Deininger and Squire are that observations be based on household surveys and an exhaustive coverage of income sources (p.568).

[25] United Nations University -World Institute for Development Economics Research (UNU-WIDER).

WIID1 by Atkinson and Brandolini (2001), Pyatt (2003) and Székely and Hilgert (1999), the people from UNU/WIDER decided to construct a new database – WIID2 – which, according to them, is not so much an update as a new database. New estimates have been added, old estimates have been replaced where more reliable estimates were available. This dataset includes the new data of Deininger and Squire (2004), data from the Luxembourg Income Study (LIS), Transmonee data by UNICEF/ICDC, and data from statistical offices and research studies (UNU-WIDER, p.8).[26]

Despite the significant improvements from Deininger and Squire 1996 to WIID1 and WIID2, in their recent release notes (May 2007), WIDER recommends the use of estimates of SEDLAC (2007) for Latin American countries (UNU-WIDER 2007):

> The Latin American inequality data expert Leonardo Gasparini (CEDLAS), responsible for the income distribution estimates in the SEDLAC database, informed us that contrary to what is often reported, the income concept in most Latin American surveys consists in practice of a mixture of gross and net income items (in terms of taxation). We have not corrected the income concept for all our sources, but users should be aware of that despite of the reporting the true income concept is not completely clear in this respect. We recommend the use of the estimates of SEDLAC (2007) for Latin American countries since some degree of harmonization has been carried out. Most of the estimates of Gasparini (2005) have been replaced by those of SEDLAC (2007) due to overlapping observations.

[26] United Nations Children's Fund -International Child Development Centre (UNICEF-ICDC).

(2) Compilations specifically of data for Latin America

SEDLAC is a joint initiative of the World Bank, the Inter-American Development Bank and the United Nations Economic Commission for Latin America and the Caribbean (ECLAC). The main purpose of this initiative is to make statistics available on poverty and other distributional and social variables for 25 Latin American and Caribbean countries for the years 1986-2010. The source of these data is the household surveys obtained from the databank of the Measurement of Living Conditions in Latin America and the Caribbean (MECOVI) program.

Among the statistics made available, the following inequality indicators, computed over the distribution of several income variables, are estimated: Share of deciles, income ratios, gini coefficient, Theil index, coefficient of variation, Atkinson index, and the generalized entropy index with different parameters. While the SEDLAC database is a great resource, its data are not presented in a fashion that allows for the kind of analysis being proposed. Specifically, information is not provided that allows for the computation of Theil's T statistic according to sectoral and regional components.

(3) Compile data from household surveys

Given the complications associated with using the compilations of other groups, as described above, another option is to return to the micro-data of the household surveys.

Challenges for Comparative Analysis

Besides the intrinsic problems with household surveys, there are methodological difficulties when it comes to comparing inequality indicators

obtained from household surveys in Latin America. Székely and Hilgert (1999), after studying these issues using household surveys for 18 Latin American and the Caribbean countries conclude (Székely and Hilgert 1999, p.6):

> Surprisingly, our analysis shows that the impression obtained about the ranking of countries in terms of inequality, and that our ideas about the effect of inequality on other development indicators, can be a mere illusion caused by differences in the characteristics of household surveys, and by the way in which the data is treated.

Among the problems that Székely and Hilgert (1999) discuss, the following stand out when it comes to comparing households in Latin America:

- Income Categories. Latin American household surveys do not achieve the same coverage of income sources. Székely and Hilgert describe 4 income categories: labor income, capital rents, property rents, and non-monetary income. Of these income concepts, labor income is the only concept uniformly applied.
- Timing. Countries conduct their household surveys at different times of year. This can introduce bias in two ways: (1) if economic activity is cyclical within years, or if household composition changes with the seasons (e.g. day laborers in the agricultural sector).
- Missing and Zero Income. In the case of Latin American household surveys, the percentage of missing and zero income differs between countries; the gini coefficient is computed by dropping all these observations. While this may not greatly affect the sample in some countries, in other countries the proportion can be significant. While authors have theorized about the reasons or proposed adjustments to handle missing or zero values, the direction of bias introduced from survey to survey is unclear.

Furthermore, as noted by Gasparini, Cruces *et al.* (2008, p.3):

> …Most countries experienced changes in their household surveys in the 1990s and 2000s. In many cases the geographical coverage was broadened, monthly surveys were replaced by annual, and the questionnaires were improved. Although these changes are certainly welcome, they pose significant comparison problems.

The Intrinsic Problems with Household Surveys

Since the late 1970s, studies of inequality have focused on the distribution of household income, using household surveys as their primary source of information. Household surveys provide a number of insights into a country's economic makeup, its socio-demographic and socioeconomic characteristics. However, they also present significant limitations. Limitations of surveys include: (1) limitations of territorial extent (coverage), (2) biases introduced by allowing individuals to provide their own responses, (3) incapability of incorporating the richest households in a distribution, and (4) the incomplete capture of income other than wages and cash transfers.

(1) Coverage

Household surveys in some Latin American countries may not cover the entire national population; in the case of Argentina for example, only the urban areas are surveyed. The other major problem regarding coverage relates to the fact that some countries have extended their geographical coverage over time. For example, when the Argentine National Institute of Statistics and Census (Instituto Nacional de Estadística y Censos, or INDEC) began performing its Permanent Household Survey (EPH) in 1973, it covered only the greater Buenos Aires area. Over time, it has extended its reach, having grown to cover 31 urban

agglomerates and one urban-rural area (INDEC 2003, p.3). While the progressive incorporation of urban agglomerates has contributed to improving the coverage of the survey, and as such to obtaining a better understanding of the socio-demographic and socioeconomic characteristics of the country, the gradual incorporation of the smaller urban agglomerates also brought with it a methodological problem - namely, how to reconcile the different coverage of the statistical series, given that the number of urban agglomerates was changing over the years. This problem has led many researchers working with household surveys to focus exclusively on the regions for which the longest consistent time series exist – typically the capital cities, with perhaps a few additional major urban centers. Alternatively, separate, shorter time series can be presented for periods in which coverage was greater.

(2) Bias introduced by self-response

While the question of coverage is important, there are other concerns of even greater significance about the information supplied by household surveys. In particular, the fact that survey participants themselves provide the responses to survey questions about income results in different estimation biases. The following problems with individual responses are among the most cited: (1) (misreporting) under-reporting[27] (2) missing values, (3) zero income, and (4) non-response to questions about income. Because of this, in all studies whose primary objective is to estimate the distribution of income or poverty for a specific period of time, the authors have to be very specific about how they have chosen to treat

[27] Misreporting can be due to the difficulty in measuring or to under-reporting.

the data to compute their statistical series, as their choices will influence the calculations they present.

Among these biases introduced by individual response, the one most discussed in the literature is the under-reporting of income, which exerts a downward pressure on estimates of inequality resulting from data taken from household surveys (Beccaria and Orsatti 1986; Altimir 1987; Petrecolla 1996; Altimir and Beccaria 1999). This impact is clearly demonstrated when incomes derived from household surveys are compared with those derived from country records of national accounts.

According to Gasparini, Horenstein *et al.* (2006, p.8):

> …under-reporting can be the consequence of the deliberate decision of the respondent to misreport, or to the absence of questions to capture some income sources, or to the difficulties in recalling or estimating income from certain sources. Although some sources more relevant for the poor as earnings from informal activities and home production are likely to be under-reported, capital income is probably the main under-reported income source.

The real problem presented by under-reporting is that typically it is not random, but rather is strongly concentrated in the medium- and high-income strata, and is greater between salaried respondents (those who earn wages from an employer) and un-salaried respondents (whose earnings are derived from business income and property). Similarly, under-reporting of rents derived from the possession of physical or monetary assets in a foreign country is significant (Beccaria and Orsatti 1986, p.9). Salvia and Donza (1999) specifically mention that profits, capital gains, and transfers are the types of income most frequently under-reported. Gasparini, Horenstein *et al.* (2006, p.8) provide the most damning

evidence of the extent to which capital incomes are under-reported: "the share of capital income and profits captured by LAC household surveys is on average 4%, which is clearly too low as compared to National Accounts figures."

Confronted with the problem of under-reporting of income and the biases it introduces, authors have opted to perform a variety of adjustments to the data to correct the distributions. The works of Altimir (1987), Salvia and Donza (1999), among others, have punctuated the need to make adjustments to correct for the problems of under-reporting and non-response, if survey results from one year to the next are to be comparable. Nevertheless, it should be taken into account that, as recognized by these authors, whatever criteria are chosen for correcting the data is inevitably arbitrary, and can introduce bias.

(3) Difficulties in Capturing the Wealthiest Households

Under-representation of the wealthiest households is a pervasive problem in household surveys, with obvious implications for estimates of inequality based on these data. The issues are two-fold. The first is the basic limitation of sampling methods, which invariably produce samples in which the wealthiest households are under-represented as compared to the overall population. The second reason why the income of wealthy households is under-represented in national surveys is related to the above-mentioned biases introduced when surveys are completed by the survey participants: non-response and under-response.

Salvia and Donza (1999) note that estimation biases derived from non-response or partial responses to the EPH questions about income must be taken into account, because not only are the cases of non-response and under-response

not random, they are specifically more prevalent among higher income respondents. According to the authors:

> …there is no doubt that the loss of households and of income due to non-response presents a relatively minor impact in the lower strata of the social structure (first and second quintiles), while households with higher incomes tend to refuse to respond or not provide complete information about their incomes. The situation would be the same if we were to analyze survey respondents. This is to say, the social bias of non-declaration of income is evident (author's translation), (Salvia and Donza 1999, p.11).

For comparative analysis, the problem of under-representation of the wealthiest households in a survey's sample is exacerbated by the differences in the coverage of the wealthiest people between surveys across Latin America. This is especially a problem for estimating inequality in Latin America, where so much income is concentrated in the wealthiest 10 percent of the population. The implication of this concentration is that inequality in Latin America results from the difference between the very rich and everyone else, as opposed to that between the middle and low-income deciles. The result is that inequality estimates based on household surveys tend to under-estimate inequality (Székely and Hilgert 1999).

(4) Incomplete Capture of Income Other Than Labor Income

For a number of reasons, survey respondents tend to underestimate their total income, so surveys do not present a complete picture of household income. Rather, what is actually captured is essentially labor income. Respondents are likely to report wages earned and income from self-employment, as well as income from certain other sources like retirement and pensions or other public money transfers, as well as cash transfers received (Altimir and Beccaria 1999).

However, capital and property income are much less frequently reported, due to non-response or under-reporting, the scope of which can be quite large. For the Latin America region, Gasparini, Cruces *et al.* note that:

> ….Non labor income is composed of income from capital, rents and profit, pensions, interhousehold transfers and remittances, government transfers and the implicit rent from owned property. Household surveys, however, do not usually provide reliable estimates of capital and related income, and this is especially true for the data collection efforts in the region. Most of income from this source is concentrated in the higher levels of the income distribution – households in the fifth quintile of per capita income account, on average, for around 80 percent of this source. Moreover… capital and related incomes only account for 2.7 percent of individual total income on average, which is far from the estimates obtained by national accounts or other methodologies. This distribution and the high probability of underreporting of capital income probably imply a downward bias in inequality measures in the region (Gasparini, Cruces *et al.* 2008, p.11).

As Behrman, Birdsall *et al.* (2007,p.58) put it "the distribution of labor income primarily governs the overall distribution of income in the region." The direct consequence is that many authors prefer to work just with labor income.

Having provided a general overview of the historical context to this dissertation, as well as the different approaches to studying income distribution, and the methods, and data employed by other scholars to identify the determinants of inequality, the following chapters present the best methods and data chosen for this study to address the specific research questions posed in this dissertation.

References

Acosta, Pablo and Leonardo Gasparini. 2007. "Capital Accumulation, Trade Liberalization, and Rising Wage Inequality: The Case of Argentina." *Economic Development & Cultural Change* 55(4):793-812.

Alejo, Javier 2006. "Desigualdad Salarial en el Gran Buenos Aires: Una Aplicación de Regresión por Cuantiles en Microdescomposiciones." CEDLAS Working Paper No. 36, Centro de Estudios Distributivos, Laborales y Sociales, Buenos Aires, Argentina.

Altimir, Oscar. 1986. "Estimaciones de la Distribución del Ingreso en la Argentina, 1953-1980." *Desarrollo Económico* 25(100):521-566.

—. 1987. "Income Distribution Statistics in Latin America and Their Reliability " *Review of Income & Wealth* 33(2):111-155.

Altimir, Oscar and Luis Beccaria. 1999. "Distribución del Ingreso en la Argentina." Serie Reformas Económicas No. 40, Comisión Económica para América Latina y el Caribe (CEPAL), Santiago, Chile.

Altimir, Oscar, Luis Beccaria, and Martín González Rozada. 2001. "La evolución de la distribución del ingreso familiar en argentina: Un análisis de sus determinantes." Serie de Estudios en Finanzas Públicas, Universidad Nacional de La Plata, Buenos Aires, Argentina.

Atkinson, Anthony B. 1997. "Bringing Income Distribution in From the Cold." *The Economic Journal* 107(440):297-321.

Atkinson, Anthony B. and Andrea Brandolini. 2001. "Promise and Pitfalls in the Use of "Secondary" Data-Sets: Income Inequality in OECD Countries as a Case Study." *Journal of Economic Literature* 39(3):771-799.

BCRA. 1975. "Sistema de cuentas del producto e ingreso de la Argentina." Banco Central de la República Argentina Buenos Aires.

Beccaria, Luis. 1991. "Distribución del Ingreso en la Argentina: Explorando lo sucedido desde mediados de los setenta." *Desarrollo Económico* 31(123):319-338.

Beccaria, Luis, Roxana Maurizio, Fernando Groisman, and Mariana Laura González. 2006. "La Sobreeducación en la Provincia de Buenos Aires: Un

análisis Exploratorio." Instituto de Ciencias. Universidad Nacional de General Sarmiento, Buenos Aires, Argentina.

Beccaria, Luis and Alvaro Orsatti. 1986. "La Distribución Personal del Ingreso en el Gran Buenos Aires en el período 1974-1983." CEPAL Working Paper No. 23, Comisión Económica para América Latina y el Caribe, Buenos Aires, Argentina.

Behrman, Jere R., Nancy Birdsall, and Miguel Székely. 2001. "Pobreza, desigualdad, y liberalización comercial y financiera en América Latina." IDB Working Paper No. 449, Inter American Development Bank, Washington, D.C.

—. 2003. "Economic Reforms and Wage Differentials in Latin America." Working Paper No. 29, Center for Global Development, Washington, D.C.

Behrman, Jere R., Nancy Birdsall, and Miguel Székely. 2007. "Economic Policy Changes and Wage Differentials in Latin America." *Economic Development and Cultural Change* 56(1):57-97.

Bourguignon, François, Francisco H. G. Ferreira, and Nora Lustig. 1998. "The microeconomics of income distribution dynamics in East Asia and Latin America." Research Proposal, IDB-World Bank Washington, D.C.

—. 2005. *The Microeconomics of Income Distribution Dynamics in East Asia and Latin America*, Washington, DC [New York]: World Bank; Oxford University Press.

Bourguignon, François, Martin Fournier, and Marc Gurgand. 1998. "Distribution, Development and Education: Taiwan, 1979-1994." Available at SSRN: http://ssrn.com/abstract=587202.

Bravo, David, Dante Contreras, and Sergio Urzúa. 2002. "Poverty and inequality in Chile 1990-1998: Learning from Microeconomic simulations." Serie Documentos de Trabajo, Departamento de Economía, Universidad de Chile, Santiago, Chile.

Cicowiez, Martín. 2002. "Comercio y Desigualdad Salarial en Argentina: Un Enfoque de Equilibrio General Computado." Departamento de Economía, Facultad de Ciencias Económicas, Universidad Nacional de La Plata, Buenos Aires, Argentina.

Contreras, Dante and Sebastián Gallegos. 2007. "Descomponiendo la desigualdad salarial en América Latina: ¿Una década de cambios?" Serie estudios estadísticos y prospectivos No.59, CEPAL, Santiago, Chile.

Cornia, Giovanni Andrea. 2011. "Economic Integration, Inequality and Growth: Latin America vs. the European economies in transition." DESA Working Paper No. 101, United Nations Department of Economic and Social Affairs.

De Pablo, Juan Carlos. 1977. "Un análisis sectorial de la distribución funcional del ingreso." *Desarrollo Económico* 16(64):555-569.

Deininger, Klaus and Lyn Squire. 1996. "A New Data Set Measuring Income Inequality." *World Bank Economic Review* 10(3):565-591.

Diéguez, Héctor L. and Alberto Petrecolla. 1974. "La distribución funcional del ingreso y el sistema previsional en la Argentina, 1950-1972." *Desarrollo Económico* 14(55):423-440.

ECLAC. 2010. "Time for Equality. Closing gaps, Opening trails." Economic Commission for Latin America and the Caribbean, Santiago, Chile.

Ferreira, Francisco H. G., Phillippe G. Leite, and Matthew Wai-Poi. 2007. "Trade liberalization, employment flows, and wage inequality in Brazil." Policy Research Working Paper No. 4108, The World Bank, Washington, D.C.

Ferreira, Francisco H.G. and Ricardo Barros. 2000. "Education and Income Distribution in Urban Brazil, 1976-1996." *CEPAL Review* 71:41-61.

Fields, Gary S. 2002. "Accounting for Income Inequality and its Change: A New Method, With Application to the Distribution of Earnings in the United States." Working Paper No. 265, Cornell University ILR School.

Frenkel, Roberto and Martin González Rozada. 2000. "Balance-of-Payments Liberalization: Effects on Growth, Employment and Income in Argentina." CEPA Working Paper No. 14, Schwartz Center for Economic Policy Analysis, New School University.

Galbraith, James K. 1998. *Created Unequal: The Crisis in American Pay. A Twentieth Century Fund Book*, New York: The Free Press.

—. 2009. "Inequality, Unemployment and Growth: New Measures for Old Controversies." *Journal of Economic Inequality* 7(2):189-206.

Galiani, Sebastian and Guido Porto. 2010. "Trends in Tariff Reforms and in the Structure of Wages." *Review of Economics and Statistics* 92(3):482–494.

Galiani, Sebastian and Pablo Sanguinetti. 2003. "The impact of trade liberalization on wage inequality: evidence from Argentina." *Journal of Development Economics* 72:497– 513.

Ganuza, Enrique and Lance Taylor. 1998. "Macroeconomic Policy, Poverty, and Equality in Latin America and the Caribbean." Working Paper No. 6, Center for Economic Policy Analysis. New School for Social Research, New York.

Gasparini, Leonardo. 2003. "Argentina's Distributional Failure: The role of Integration and Public Policies." CEDLAS Working Paper No.1, Centro de Estudios Distributivos, Laborales y Sociales, Universidad Nacional de la Plata, Buenos Aires, Argentina.

Gasparini, Leonardo and Guillermo Cruces. 2008. "A Distribution in Motion: The Case of Argentina." Documento de Trabajo Nro. 78, Centro de Estudios Distributivos, Laborales y Sociales (CEDLAS), Universidad Nacional de la Plata, Argentina.

Gasparini, Leonardo, Guillermo Cruces, and Leopoldo Tornarolli. 2008. "Is Income Inequality in Latin America Falling?" in *XLIII Asociación Argentina de Economía Política*. Córdoba, Argentina.

—. 2009. "Recent trends in income inequality in Latin America." ECINEQ Working Paper No. 132.

Gasparini, Leonardo, Matias Horenstein, and Sergio Olivieri. 2006. "Economic Polarisation in Latin America and the Caribbean: What do Household Surveys Tell Us?", Documento de Trabajo Nro. 38, Centro de Estudios Distributivos, Laborales y Sociales (CEDLAS), Universidad Nacional de la Plata, Argentina.

Gasparini, Leonardo, Mariana Marchionni, and Walter Sosa Escudero. 2005. "Characterization of Inequality Changes through Microeconometric Decompositions: The Case of Greater Buenos Aires." in *The Microeconomics of Income Distribution Dynamics in East Asia and Latin America*, edited by F. Bourguignon, F. H. G. Ferreira, and N. Lustig. New York: World Bank and Oxford University Press.

Gavan, James. 1968. "Sobre la Distribución Funcional del Ingreso en Chile." *Cuadernos de Economia-Latin American Journal of Economics* 5(15):34-48.

González-Rozada, Martín and Alicia Menendez. 2006. "Why Have Urban Poverty and Income Inequality Increased so Much? Argentina, 1991-2001." *Economic Development and Cultural Change* 55(1):109-138.

Graña, Juan M., Damián Kennedy, Javier Lindenboim, and Carlos Pissaco. 2005. "La distribución funcional del ingreso en Argentina: incidencia de los precios relativos en la última década " in *Septimo Congreso Nacional de Estudios del Trabajo* Buenos Aires, Argentina.: Asociación Argentina de Especialistas en Estudios del Trabajo

Groisman, Fernando. 2003. "Devaluación educativa y segmentación en el mercado de trabajo del área metropolitana de Buenos Aires entre 1974 y 2000." *Estudios del trabajo* 25:73–97.

INDEC. 2003. "La nueva Encuesta Permanente de Hogares de Argentina." Instituto Nacional de Estadística y Censos (INDEC), Buenos Aires, Argentina.

Juhn, Chinhui, Kevin M. Murphy, and Brooks Pierce. 1993. "Wage inequality and the rise in returns to skill." *Journal of Political Economy* 101(3):410.

Kanbur, Ravi and Nora Lustig. 1999. "Why is Inequality Back on the Agenda?" in *Annual Bank Conference on Development Economics, World Bank*. Washington, D.C.

Larraín Bascuñán, Felipe and Rodrigo M. Vergara. 2001. "La Transformación Económica de Chile." Santiago, Chile: Centro de Estudios Públicos.

Larrañaga, Osvaldo. 2001. "Distribución de Ingresos en Chile: 1958-2001." Working Paper No.178, Departamento de Economía, Universidad de Chile, Santiago, Chile.

Larrañaga, Osvaldo and Humberto Vega Fernández. 2000. "Estudio sobre la Distribución del Ingreso: Estructura Funcional en 1987-96 y Proyecciones." Departamento de Economía. Universidad de Chile-Unidad de Estudios Prospectivos Mideplan, Santiago, Chile.

Lindenboim, Javier. 2008. "Distribución Funcional del Ingreso, un tema olvidado que reclama atención." *Problemas del Desarrollo. Revista Latinoamericana de Economía* 39(153):83-117.

Lindenboim, Javier, Juan M. Graña, and Damián Kennedy. 2005. "Distribución Funcional del Ingreso en Argentina. Ayer y Hoy." Working Paper N° 4, CEPED-IIE-FCE-UBA, Buenos Aires, Argentina.

López-Calva, Luis Felipe and Nora Lustig. 2010. "Declining Inequality in Latin America: A Decade of Progress?": Brookings Institution Press.

Lora, Eduardo. 2001. "Structural Reforms in Latin America: What Has Been Reformed and How to Measure it." IDB Working Paper No. 466, Inter-American Development Bank, Washington, D.C.

Lustig, Nora. 2009. "Poverty, Inequality and the New Left in Latin America." Woodrow Wilson International Center for Scholars, Washington, D.C.

Lustig, Nora and Darryl McLeod. 2009. "Are Latin America's New Left Regimes Reducing Inequality Faster? Addendum to Poverty, Inequality and the New Left in Latin America." Woodrow Wilson International Center for Scholars, Washington, D.C.

Maurizio, Roxana 2001. "Demanda de trabajo, sobreeducación y distribución del ingreso." 5 Congreso Nacional de Estudios del Trabajo, Buenos Aires, Argentina.

Monsueto, Sandro Eduardo, Ana Flávia Machado, and André Braz Golgher. 2006. "Earning inequalities in Brazil: quantile regressions and the decomposition approach." *CEPAL Review* 90:169-187.

Monza, Alfredo. 1973. "La medición empírica de la distribución funcional del ingreso." *Desarrollo Económico* 13(50):315-332.

Morley, Samuel, A., Roberto Machado, and Stefano Pettinato. 1999. "Indexes of Structural Reform in Latin America." Serie Reformas Económicas No.12, Economic Commission for Latin America and the Caribbean (ECLAC), Santiago, Chile.

Orsatti, Alvaro. 1983. "La nueva distribución funcional del ingreso en la Argentina " *Desarrollo Económico* 23(91):315-337.

Passicot Callier, Andrés. 1969. "Comentarios al Artículo "Sobre la Distribucion Funcional del Ingreso en Chile"." Cuentas Sociales de ODEPLAN, Santiago, Chile.

Pavcnik, Nina, Andreas Blom, Pinelopi Goldberg, and Norbert R. Schady. 2004. "Trade Liberalization and Industry Wage Structure: Evidence from Brazil." *World Bank Economic Review* 18(3):319-344.

Petrecolla, Diego. 1996. "Una Medida alternativa de la pobreza en el Gran Buenos Aires: 1989-1994." *Desarrollo Económico* 36(141):475-486.

Porto, Guido. 2006. "Using survey data to assess the distributional effects of trade policy." *Journal of International Economics* 70(1):140-160.

Pyatt, Graham. 2003. "Development and the Distribution of Living Standards: A Critique of the Evolving Data Base." *Review of Income and Wealth* 49(3):333-358.

Robbins, Donald. 1994. "Relative wage structure in Chile, 1957-1992: changes in the structure of demand for schooling." *Estudios de Economia* 21(9):49-78.

Salvia, Agustín and Eduardo Donza. 1999. "Problemas de medición y sesgos de estimación derivados de la no respuesta a las preguntas de ingresos en la EPH (1990-1998)." *Estudios del trabajo* 18.

Sánchez-Páramo, Carolina and Norbert Schady. 2003. "Off and running? Technology, trade and the rising demand for skilled workers in Latin America." Working Paper No. 3015, The World Bank, Washington, D.C.

Sotomayor, Orlando J. 2004. "Education and Changes in Brazilian Wage Inequality, 1976-2001." *Industrial and Labor Relations Review* 58(1):94-111.

Székely, Miguel and Marianne Hilgert. 1999. "What's Behind the Inequality We Measure: an Investigation Using Latin American Data." IDB Working Paper No. 409, Inter-American Development Bank, Washington, D.C.

UNU-WIDER. "World Income Inequality Database: User Guide and Data Sources." World Institute for Development Economics Research of the United Nations University, Helsinki, Finland.

—. 2007. "WIID2b Revision notes." World Institute for Development Economics Research of the United Nations University, Helsinki, Finland.

Williamson, John. 1990. "What Washington Means by Policy Reform." in Latin American Adjustment: How Much Has Happened?, edited by J. Williamson. Washington, D.C.: Peterson Institute for International Economics.

Chapter 3: Methods

This dissertation applies Theil's T statistic to semi-aggregated employment and wage data to measure and analyze pay inequality in Argentina, Brazil and Chile. Theil's T statistic and the Theil decomposition method can be found in the existing literature applied to these particular countries (Altimir and Beccaria 1999; Gasparini 1999; Almeida dos Reis and Paes de Barros 1991) among others. However, this dissertation differs from previous efforts in the decompositions presented, the kind of variables included and the source of information employed.[28] Departing in this way from previous studies, this dissertation provides new evidence about the dynamics of inequality in the three countries since the beginning of the 1990s.

The purpose of applying Theil's T statistic to analyze inequality is not to supplant inequality measures such as the gini coefficient computed from microdata (typically, household surveys). Rather, the objective is to construct new measures of inequality from data that have not been used for this purpose. This dissertation does not attempt to relate inequality outcomes to individual characteristics such as education or experience. As such, it does not require the measurement of inequality with individual data.

For this study's purposes, the dynamics of inequality – trends across time – are more interesting than its absolute levels. To make valid comparisons across the three countries, percentage changes in each countries' Theil indices over time will be compared; because population sizes and the structure of the subgrouping

[28] For a thorough discussion of the usage of Theil's T statistic to measure inequality see Conceição 2000.

of the data differ across countries, differences in the absolute levels of Theil's T statistic do not have meaning. Furthermore, the study depends heavily on the group-wise decomposition of measured inequality, whereby the roles of certain subgroups – specifically, economic sectors and geographic units – can be better understood. This chapter presents the key method on which this dissertation relies – Theil's T statistic – and lays out the specific advantages this method provides for accomplishing the objectives of this study.

APPLICATION OF THEIL'S T STATISTIC TO THE DATA USED IN THIS DISSERTATION

Fundamentally, the goal is to investigate the factors that may explain the evolution of pay inequality in the formal labor markets of Argentina, Brazil and Chile by analyzing the dynamics of salaries across two dimensions - economic sectors and geographic units - to observe changes in the structure of pay in each of these countries.

The calculations presented in this dissertation are performed on data obtained from semi-aggregated datasets in which employment and average wage data organized by economic sectors and geographical jurisdictions, as derived from administrative records, are reported on regular intervals (monthly, quarterly, annually). Specifically, for Argentina this dissertation employs data on wages and employment derived from the administrative registry of the Argentine Integrated Pension System (Sistema Integrado Previsional Argentino, or SIPA), based on the information provided by the Federal Administration of Public Revenues (Administración Federal de Ingresos Públicos, or AFIP). For Brazil, data are derived from the Central Business Registry (Cadastro Central de Empresas, or CEMPRE), which is provided by the Brazilian Institute of

Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica, or IBGE). Finally, for Chile this dissertation employs an administrative registry of the pension system provided by the Superintendency of Pension Fund Administrators (Superintendencia de Administradoras de Fondos de Pensiones, or SAFP). These sources, and the information taken from them, are discussed in detail in the Data chapter.

The key advantages that applying Theil's T statistic to these data provides, as compared to other inequality measures (generally computed with data from other sources), are that (1) it provides coverage of rural and urban populations, (2) it is available on regular and frequent intervals, and, (3) most importantly, it can be decomposed to reveal the specific roles of individual groups. The key disadvantage of Theil's T statistic as applied to these data is that coverage is limited to the formally employed population.

CHARACTERISTICS OF THEIL'S T STATISTIC

Theil's T statistic is a generalized, entropy-based measure created by Henri Theil, who developed this measure drawing from the field of information theory.[29] It offers certain advantages over other inequality measures that are of particular importance for its application in this dissertation. In addition to being Lorenz consistent, Theil's T statistic has four properties that are important for inequality measure (Conceição and Galbraith 2000):

(1) Symmetry (or anonymity rule): the measure of inequality is not tied to the identity of individuals that earns a given income.

(2) Replication Invariance (or population principle): the measure of inequality is independent of the population size.

[29] For an explanation of the derivation of Theil's T statistic from information theory, see Conceição and Galbraith (2000).

(3) Scale Invariance (or income-zero-homogeneity property): the measure of inequality is invariant when all incomes are multiplied by the same scalar.
(4) Satisfaction of the Pigou-Dalton principle of transfers: income transferred from a rich person to a poor person decreases inequality.

The most important feature of Theil's T statistic, for the purposes of this research, is its decomposability, a characteristic inherent to all entropy measures. Specifically, Theil's T statistic allows for a kind of decomposition that has been defined as "additively decomposable" (Shorrocks 1980, p.614). According to this definition, if a population is divided into subgroups, overall inequality can be additively decomposed into a sum of a "between-group" and "within-group" inequality, where within-group inequality is defined as a weighted sum of the inequality within each subgroup. The relevance of decomposable measures has been demonstrated in numerous empirical studies that examine the properties of these additive inequality measures (Shorrocks 1980; Shorrocks 1984; Bourguignon 1979; Cowell 1980).

For decomposition analysis, then, the choice of the inequality measure to be used is critical. As has been demonstrated by Cowell (2009, p. 62-64), the gini coefficient is not additively decomposable. Whereas with Theil's T statistic, an increase in inequality within subgroups of the population will always produce an increase in overall inequality (and vice versa), Cowell demonstrated that one can construct a case in which inequality in every subgroup of a population increases while overall inequality, as measured by the gini coefficient, decreases.

The advantage of having a decomposable measure is that it facilitates analysis of the distribution of wages according to criteria that divide the overall population into subgroups. Two types of subgroups of the employed population

are considered in this research: economic sectors and geopolitical units (regions, states or provinces, and municipalities).

While this decomposition according to subgroups (or what may be called explanatory variables) can reveal trends, it does not provide explicit information about causality. Rather, the shifting contributions of different subgroups provide insights into the mechanisms causing overall inequality to shift. Altimir and Piñera (1979, p. 208) explain the function of decomposing Theil's T statistic as follows:

> even if analysis of the decomposition of Theil's T statistic does not go so far as to venture into the field of the mechanisms of causality between income and the different characteristics or 'explanatory' variables, it facilitates and illuminates the formulation and verification of hypotheses about these causal relationships (author's translation).

COMPUTATION OF THEIL'S T STATISTIC[30]

Theil's T statistic can be used to compute inequality between individuals or between groups of individuals, as long as the groupings are mutually exclusive and collectively exhaustive (MECE). While this research presents calculations of Theil's T statistic using grouped data, it is instructive to first introduce the computation of Theil's T statistic with individual data and then extend to its computation with grouped data.

[30] Much of the material presented in this section is derived from the vast body of knowledge on this subject that has been assembled on the computation and application of Theil's T statistic by the University of Texas Inequality Project. A complete record of the works of participants in this project can be found at http://utip.gov.utexas.edu/.

Computation of Theil's T Statistic with Individual Data

The formula for calculating Theil's T statistic with individual income data is a summation of the ratio of each individual's income to the population's average income multiplied by the logarithm of that same ratio,

$$T = \sum_{p=1}^{n} \left\{ \left(\frac{1}{n}\right) * \left(\frac{y_p}{\mu_y}\right) \ln\left(\frac{y_p}{\mu_y}\right) \right\} \qquad Equation\ 1$$

where n is the number of individuals in the population, y_p is the income of the person indexed by p, and μ_y is the population's average income.

When calculated with individual data, Theil's T statistic is the sum of each individual's contribution, which is called the Theil element. These contributions will be positive, negative, or (rarely) zero, depending on whether the natural logarithm of the ratio y_p/μ_y is greater than one, less than one, or equal to one, respectively. As such, the contributions of individuals whose incomes are above the overall average income increase the computed value of Theil's T statistic; conversely, the contributions of individuals whose incomes are below average reduce the computed value of Theil's T statistic.[31]

If a given individual's income is exactly equal to the population average income ($y_p = \mu_y$), that individual's contribution to Theil's T statistic will be zero. Similarly, if every individual in a group of n persons has exactly the same

[31] The mathematical artifact of positive and negative contributions to the computed value of Theil's T statistic should not be interpreted to mean that only above-average wage groups can increase inequality, or that below-average wage groups always decrease inequality as explained in the subsequent discussion of the computation of Theil's T statistic with grouped data.

income, Theil's T statistic for the group will also be zero: this represents perfect equality and is the minimum value of Theil's T statistic.

Any departure from this equal distribution produces a change in the shares of income appropriated by each person, and will result in increased inequality. At the far end of the spectrum from perfect equality, if one individual has all of the income in a group, Theil's T statistic will equal the natural logarithm of n: this represents utmost inequality and is the maximum value of Theil's T statistic.[32] As such, the maximum value of Theil's T statistic depends on the size of the group for which it is being estimated, and is different for populations of different sizes.

The logarithmic construction of the Theil's T statistic has an additional important consequence. Positive contributions always outweigh negative contributions, such that the overall Theil's T statistic is always positive. Stated another way, for two individuals whose income ratios are equidistant from the mean, the absolute value of the Theil element will be larger for the individual whose contribution is above the mean, such that the net contribution to Theil's T statistic for these two individuals is positive. Furthermore, a larger difference between these two individual's incomes would produce a larger net contribution to Theil's T statistic.

Computation of Theil's T Statistic with Grouped Data

As stated previously, this dissertation does not seek to estimate inequality all the way down to the individual level, and as such relies on calculations of

[32] Computationally, Theil's T statistic does not tolerate members of a population with zero income, as the natural logarithm of zero cannot be computed, but this statement is true in the limit.

inequality between groups of individuals.[33] To do this, it applies Theil's T statistic to grouped data of wages earned and population employed across major economic sectors and geographical units (municipalities, states and regions) to obtain estimates of pay inequality for the formal labor markets of Argentina, Brazil and Chile.

Theil's T statistic estimates overall inequality with grouped data using the following formula:

$$T = \sum_{j=1}^{m}\sum_{i=1}^{n}\left(\frac{P_{ij}}{P}\right)\left(\frac{\bar{Y}_{ij}}{\bar{Y}}\right) ln\left(\frac{\bar{Y}_{ij}}{\bar{Y}}\right) \qquad Equation\ 2$$

Where i and j index two MECE groupings, which may or may not be hierarchical, but in which wage and employment data for each member of the group indexed by j must be decomposable into groups indexed by i. In this dissertation, j may be a geographic subdivision of a country of study, in which case i would index either a smaller level of geographic unit or the economic sectors into which the economic activity of all the geographical units of the country are organized. $\bar{Y}_{ij}$ is the average pay of the ith subgroup of the jth group: $\bar{Y}_{ij} = \left(Y_{ij}/P_{ij}\right)$. P_{ij} is the number of individuals employed in the ith subgroup of the jth group, and Y_{ij} is the total pay they earn. P is the number of individuals employed across all groups and Y is the income they earn. $P = \sum_{j=1}^{m}\sum_{i=1}^{n} P_{ij}$ and

[33] Even when researchers study inequality at the individual level, they do not generally have information on individual income for every single person of a country; they rely on sample data from household surveys.

$Y = \sum_{j=1}^{m}\sum_{i=1}^{n} Y_{ij}$. $\bar{Y}$ is the average pay across the country in question: $\bar{Y} = \left({}^{Y}/_{P}\right)$. $\left(P_{ij}/P\right)$ is the population weight.

As discussed previously, the additive decomposability of Theil's T statistic (T) estimated for a population (P) means that it can be expressed as the sum of two components: a between-groups component (T^B), and a within-groups component (T^W), as long as the members of the population can be classified into MECE groups.

$$T = T^B + T^W \qquad Equation\ 3$$

The Between-Groups Component of Theil's T Statistic

The between-groups component of Theil's T statistic can be written as follows:[34]

$$T^B = \sum_{i=1}^{n}\left(\frac{Y_i}{Y}\right)\ln\left\{\left(\frac{Y_i}{Y}\right)\Big/\left(\frac{P_i}{P}\right)\right\} \qquad Equation\ 4$$

where i indexes the groups (economic sectors or geographical jurisdictions), Y_i is the average wage in the group indexed by i, Y is again the total payroll across the entire population, P_i is the population of group i, and P is

[34] As can be observed, the structure of Theil's T statistic as formulated at the individual and group levels is the same. The structure of Theil's T statistic remains self-similar at any level of aggregation or disaggregation of the available data. This fractal property can be demonstrated for nested groups that may or may not be hierarchical in nature (Conceição, Galbraith *et al.* 2001).

the total employed population.[35] Here, $\left(Y_i/Y\right)\ln\left\{\left(\frac{Y_i}{Y}\right)/\left(\frac{P_i}{P}\right)\right\}$ is identified as the Theil element for the *i*th group.

As can be seen from the equation for T^B, the between-group component of T is composed of the summation of each group's contribution to T^B (these contributions are also referred to as individual 'Theil elements'). Similar to the discussion of individual data, the logarithmic nature of the statistic determines whether a group's contribution is positive or negative according to whether wages in that group are above or below average, and dictates that the overall value of T^B is always positive. In working with grouped data, the logarithmic construction of the statistic also determines that a group's size (the number of people in the group) limits the size of that group's contribution. All other things (wages) equal, a sector or geographic unit with lower employment will make a smaller contribution to Theil's T statistic than one with higher employment levels.

Any group's contribution to the inequality between groups can be compared to that of any other group using the groups' Theil elements. However, some caution must be applied in interpreting the meaning of these contributions, particularly those that are negative. Mathematically, the high wage groups contribute positively to Theil's T statistic and the low-wage groups contribute negatively, which gives the impression that inequality (as measured with Theil's T statistic) increases because of high-wage groups and decreases due to the low-

[35] The intuitive idea behind this formula is that Theil's T statistic provides a measure of the discrepancies between the distribution of income and the distribution of population between groups (Conceição and Ferreira 2000, p.52).

wage groups. However, as shown in Table 3-1, changes in the composition (wages or population employed) of both high and low wage groups can cause inequality to either increase or decrease, depending on the type of change that occurs.

Table 3-1. Impact on Inequality of Changes in the Composition of High- and Low-Wage Groups, all Other Things Equal

Compositional Change	**High-Wage**	**Low-Wage**
↑ Income	**+**	**-**
↓ Income	**-**	**+**
↑ Population	**+**	**+**
↓ Population	**-**	**-**

Inequality increases when wages in either high-wage or low-wage groups move away from the mean and, conversely, decreases when wages move towards the mean. Increases in the population employed in a given group, whether high or low wage, will increase that group's contribution, and serve to increase inequality.

Mathematically, in the computation of Theil, no change in an individual group's Theil element can occur without provoking a change in the Theil elements of the other groups: for instance, a reduction in the average wage of employees in a below-average wage group will reduce that group's Theil element, but it will also reduce the economy-wide average wage, which in turn changes the relationship between all other groups' average wages and the overall average wage. As such, any change that increases the size of a low-wage group's negative contribution (all other things remaining equal) must be offset by a

larger increase in the total positive contributions of the groups with above average wages, such that the overall value of T^B actually increases.

As demonstrated in the stacked bar graphs in the subsequent chapters dedicated to each of the three countries of study, inequality between groups is maximized when both the positive and the negative contributions to Theil's T statistic are maximized; similarly, total inequality is at a minimum when both positive and negative contributions are minimized. For this reason, this dissertation adopts the convention adopted by Galbraith and Hale (2009) of contributions "from above" and contributions "from below" to discuss the role of high-wage and low-wage groups, respectively, in driving observed trends in pay inequality.

The Within-Groups Component of Theil's T Statistic

The within-groups component of Theil's T statistic as used in this dissertation is estimated by computing the inequality between each of the subgroups *i* of each group *j* and applying the income weight of each group *j* to estimate that group's contribution to within-group inequality:

$$T^W = \sum_{j=1}^{m} \frac{Y_j}{Y} T'_j \qquad Equation\ 5$$

where $Y = \sum_{j=1}^{m} \sum_{i=1}^{n} Y_{ij} = \sum_{j=1}^{m} Y_j$ and Y_J/Y is the income weight for the *j*th group. T'_j is the between-subgroup within group Theil's T statistic for the *j*th group. This between-subgroup within group Theil's T statistic is expressed as follows:

$$T'_j = \sum_{i=1}^{n} \left(\frac{Y_{ij}}{Y_i}\right) \ln\left(\frac{\bar{Y}_{ij}}{\bar{Y}_j}\right) \quad \forall\, j \qquad \textit{Equation } 6$$

APPLICATION OF THEIL'S T STATISTIC TO THIS DISSERTATION

Because of Theil's T statistic's additive decomposability, the between-groups component (T^B) represents a lower bound of overall pay inequality (T). This dissertation relies heavily on T^B because information on the omitted inequality – that within groups (T^W) – is generally not available.[36] Given the small number of groups and large number of people represented by these groups, T^B is, admittedly, a coarse measurement. However, extensive work has been performed to demonstrate, both theoretically and empirically, that T^B, as applied in this work, is sufficient to capture broad movements in inequality.

Conceição and Galbraith (2000, p. 68) have demonstrated that "a measure of change in T^B is likely to be a robust estimate of the change in T, so long as changes in the employment structures and the distribution of the workforce across categories are not too large."[37]

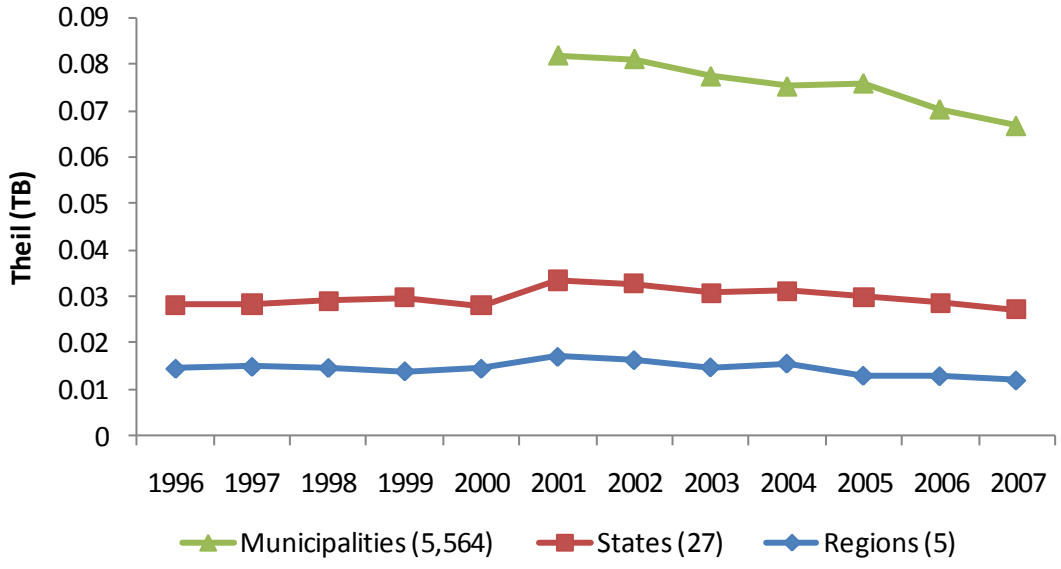
Calculations performed for this dissertation also provide confirmation that changes in inequality over time at low levels of disaggregation are, in fact, reflective of the changes happening at greater levels of disaggregation. For

[36] In some instances, a within-groups inequality (T^W) is presented. However, as discussed previously, this T^W still relies on grouped data (of sub-groups), as individual data were not obtained for this dissertation. The maximum value of T cannot be obtained because the entirety of T^W cannot be estimated with the data obtained for this study.

[37] For a detailed explanation of why the between sector component of Theil's T statistic tracks the overall movement of inequality see Conceição and Galbraith (2000). Another empirical approach to understand in a different way the fact that the dynamics of overall inequality can be captured using only the between group component of Theil's T statistic is that advanced by Conceição, Galbraith *et al.* (2001).

example, T^B is calculated at three levels of geographic disaggregation for Brazil: it is calculated between regions (of which there are 5), between states (27), and between municipalities (5,564). As Figure 3-1 shows, by incorporating each additional level of disaggregation into the estimated value of T^B, a greater amount of the overall T is captured in the estimate of T^B. Stated differently, the unknown (T^W) is reduced by increasing the portion of the total inequality (T) that is measured with T^B. As can be seen in Figure 3-1, the same trends are evident at the most aggregated level (regions) as are displayed at the most disaggregated level (municipalities). It follows, logically, that it is not necessary to calculate total inequality to be able to understand the trends: some intermediate level of disaggregation is clearly sufficient.

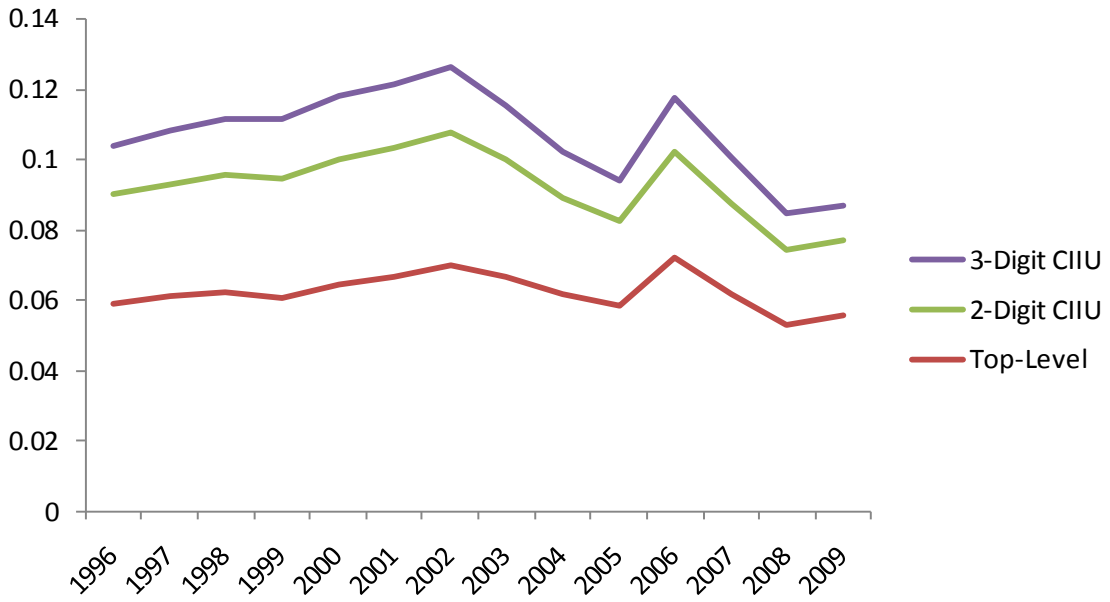
Figure 3-1. Inequality between Geographical Units in Brazil



Source: Author's calculations based on CEMPRE data.

Similarly, data available from the Argentine Ministry of Labor provide employment and wages for 14 economic sectors, which are subsequently divided into 56 sectors at the 2-digit CIIU[38] and 141 sectors at the 3-digit CIIU classification level. Calculations of T^B from the years 1996 to 2009 at these three hierarchical levels of disaggregation also demonstrate the self-similarity of trends in T^B. As with Brazilian geographic units, the trend observed at the 2-digit CIIU level is simply a magnification of the trend at the 14-sector level, and the trend at the 3-digit CIIU level is a magnification of that at the 2-digit level.

Figure 3-2. Inequality between Economic Sectors in Argentina



Source: Author's calculations based on SIPA data, as compiled by the Argentine Ministry of Labor.

[38] Classification of All Economic Activities, ISIC (Clasificación Industrial Internacional Uniforme, or CIIU).

Table 3-2 provides an overview of the various MECE groups and subgroups used in the estimation of Theil's T statistic for this dissertation.

Table 3-2. Overview of Estimates of Pay Inequality Performed Using Theil's T Statistic for This Dissertation

Country	Groupings		Between	Within	Special Groupings
Argentina	Geographic	Provinces (24)	1994-2007	1994-2007 (btwn Major Priv. Sctrs)	
	Economic Sectors	Major Private Sectors (9)	1994-2007 (by province)		
		Letter-level CIIU (21)	1994-2007		"Boom/Bust" Sectors vs. All Other Sectors
		2-Digit CIIU (56)	1996-2009		
		3-Digit CIIU (141)	1996-2009		
Brazil	Geographic	Regions (5)	1996-2007	1996-2007 (btwn Sectors)	
		States (27)	1996-2007	1996-2007 (btwn Sectors)	
		Municipalities (5,564)	1996-2007		
	Economic Sectors	High-level Sectors (15)	1996-2007		Ascendant Sectors and Sectors in Decline
Chile	Geographic	Regions (13)*	1995 - 2010 (Q2)	1995 - 2010 (btwn Sectors)	
	Economic Sectors	High-level Sectors (11)	1995-2006 (Q2)		Dynamic Sectors vs. All Other Sectors
		Expanded High-level Sectors (19)	2006 (Q3) - 2010 (Q2)		

* In October of 2007, Chile divided two regions in two, creating a new total of 15 regions. However, in this dissertation these two new regions are treated as though they had remained part of the regions from which they were formed.

This chapter has provided a brief overview of the inequality measure that is Theil's T statistic. It is a flexible analytical method that adapts itself well to the kind of data available for this study. By employing Theil's T statistic, several decompositions can be performed that directly address the specific questions raised in this dissertation.

References

Almeida dos Reis, Jose Guilherme and Ricardo Paes de Barros. 1991. "Wage inequality and the distribution of education: A study of the evolution of regional differences in inequality in metropolitan Brazil." *Journal of Development Economics* 36(1):117-143.

Altimir, Oscar and Luis Beccaria. 1999. "Distribución del Ingreso en la Argentina." Serie Reformas Económicas No. 40, Comisión Económica para América Latina y el Caribe (CEPAL), Santiago, Chile.

Altimir, Oscar and Sebastián Piñera. 1979. "Análisis de Descomposición: Una Generalización del Método de Theil." *Cuadernos de Economía* 16(48):207-236.

Bourguignon, François. 1979. "Decomposable Income Inequality Measures." *Econometrica* 47(4):901-920.

Conceição, Pedro. 2000. "Growth, Technology and Inter-industry Earnings Inequality in Manufacturing: Evidence from a Selection of OECD Countries, 1970-1990." Doctor of Philosophy, The University of Texas at Austin.

Conceição, Pedro and Pedro Ferreira. 2000. "The Young Person's Guide to the Theil Index: Suggesting Intuitive Interpretations and Exploring Analytical Applications." UTIP Working Paper No. 14, The University of Texas at Austin, Austin, Texas.

Conceição, Pedro and James K. Galbraith. 2000. "Constructing Long and Dense Time Series of Inequality Using the Theil Index." *Eastern Economic Journal* 26(1):61-74.

Conceição, Pedro, James K. Galbraith, and Peter Bradford. 2001. "The Theil Index in Sequences of Nested and Hierarchic Grouping Structures: Implications for the Measurement of Inequality Through Time, with Data Aggregated at Different Levels of Industrial Classification." *Eastern Economic Journal* 27(4):491-514.

Cowell, Frank A. 1980. "On the Structure of Additive Inequality Measures." *The Review of Economic Studies* 47(3):521-531.

—. 2006. "Theil, Inequality Indices and Decomposition." in *Dynamics of Inequality and Poverty (Research on Economic Inequality, Volume 13)*, edited by J. Creedy and G. Kalb: Emerald Group Publishing Limited, pp. 341 - 356.

—. 2009. *Measuring Inequality*: London School of Economics Perspectives in Economic Analysis series, published by Oxford University Press.

Galbraith, James K. and Travis Hale. 2009. "The Evolution of Economic Inequality in the United States, 1969-2007." UTIP Working Paper No. 57, The University of Texas, Austin, Texas.

Gasparini, Leonardo. 1999. "Un Análisis de la Distribución del Ingreso en la Argentina sobre la base de Descomposiciones." in *La Distribución del Ingreso en la Argentina*. Buenos Aires: Fundación de Investigaciones Económicas Latinoamericanas.

Shorrocks, Anthony F. 1980. "The Class of Additively Decomposable Inequality Measures." *Econometrica* 48(3):613-625.

—. 1984. "Inequality Decomposition by Population Subgroups." *Econometrica* 52(6):1369-1385.

Theil, Henri. 1967. *Economics and Information Theory*, Chicago: Rand McNally and Company.

Chapter 4: Data

This dissertation focuses on pay inequality in the formal sector of the labor markets of Argentina, Brazil, and Chile.[39] The primary sources of data on which it relies are administrative data sets maintained by agencies of the respective governments of each country. Generally, when a study is concerned with income, the primary source researchers use is household surveys. However, this study has different objectives than most studies of inequality: it is focused more on the dynamics of inequality and its macroeconomic drivers than its absolute values. For this reason, administrative data sets present an attractive alternative to the more traditionally used household surveys. As this chapter will explain, administrative data sets provide significant advantages for achieving this dissertation's purposes, particularly when combined with the flexibility of the primary analytical method used for this dissertation, Theil's T statistic.

ADVANTAGES OF ADMINISTRATIVE DATA SETS FOR GENERATING INCOME STATISTICS

Administrative sets of economic data exist in countries around the world: they are collected for tax purposes, for social security and welfare programs, or for other purposes. Data collected are categorized, aggregated, and made available to the public at no cost. These semi-aggregated administrative data sets provide important advantages over other data used to estimate inequality: advantages include their (1) geographic coverage, (2) reliability, (3) frequency of

[39] Prior to this author's contributions (Galbraith, Spagnolo *et al.* 2007; Galbraith, Spagnolo *et al.* 2008), previous studies of inequality in Latin America performed under the auspices of UTIP focused mainly on the manufacturing sector (Du Pin Calmon, Conceição *et al.* 2000; Galbraith and Garza Cantú 1999; Du Pin Calmon, Conceição *et al.* 1999; Adair 2006; Spagnolo and Munevar 2008).

reporting, (4) completeness, particularly with respect to strategic sectors, and (5) development cost.

Geographic Coverage

The administrative data sets used in this study provide near-complete geographic coverage in the countries of study.[40] Data cover almost 100 percent of the formally-employed population in both urban and rural areas.

Reliability

The data on which the calculations are based represent the work product of consistent and routine reporting by employers to government agencies. While there exists the possibility of under-reporting by employers and the possibility of administrative or clerical errors in data entry,[41] the probability of these types of error - or further that these types of errors would be systematic in such a way as to introduce bias - is minimal. As such, they are not subject to the myriad potential biases associated with the self-report data on which household surveys rely.

Frequency

In all three countries, the data are reported consistently, and with greater frequency than other data sources: reporting intervals for the Argentine and

[40] This is particularly an improvement over the household survey in the case of Argentina, because rural areas are included in these data. As stated in the CEDLAS 2010 methodological guide (p.5), "The EPH-C covers 31 large urban areas which are home to around 70% of the Argentine urban population. Since the share of urban areas in Argentina is 87%, the sample of the EPH represents around 60% of the total population of the country."

[41] A report published by INDEC (2006) observed the existence of under-declaration of wages to the SIJP in certain economic sectors and subsectors (e.g. construction, retail trade, and restaurants) in Argentina.

Chilean pension systems are monthly, while the Brazilian data are collected annually. While we work with quarterly and annual aggregations of this information, household surveys are not always carried out with the same regularity. In the case of Brazil, the household survey is performed annually,[42] while in Chile it has only been carried out once every three years since 2000.[43] Currently, the Argentine survey is a continuous survey, but this has only been the case since 2003. One of the important changes to the EPH was a methodological change that took place in 2003, the year in which INDEC began the Continuous Permanent Household Survey (Encuesta Permanente de Hogares Continua, or EPH-C). Basically, it moved from a traditional, point-in-time survey that had been administered by INDEC since 1973 to a continuous survey. With the punctual, or non-continuous EPH, the information was collected twice a year (generally in May and October), while the continuous EPH is conducted across the entire year (data are collected week by week), allowing for quarterly, semi-annual, and annual estimates (INDEC 2003).

Completeness - Strategic Sectors

Official data sets are actually better suited (than household surveys) to track the changes happening in high-wage sectors like the financial sector. By nature of their design, it is difficult for surveys to develop representative information about the small number of people working in these sectors: as

[42] The household survey in Brazil (PNAD) began in 1967, with quarterly periodicity. However, since 1971 the surveys have only been carried out once per year, in the fourth quarter, in all years except those in which the census was performed (1970, 1980, 1991 y 2000).

[43] In Chile, the CASEN was implemented twice a year between 1990 and 2000: since 2000, it has been implemented once every three years (2003, 2006 and 2009).

discussed in the literature review, they are less likely to cooperate with the survey and much less likely than other survey respondents to give accurate information.

By contrast, it is in these strategic, high-wage sectors that administrative data are likely to have their greatest coverage, as these are the sectors of a country's economy with the highest levels of formality. As such, they provide great detail on what is happening in strategic sectors like mining (which includes petroleum), public administration, and particularly finance. Surveys, which generally focus on the broad conditions of the population at-large, can provide comparatively little information about the upper echelons.

Development Cost

These data are being reported in the countries of study for other purposes: working with these data does not require the researcher to develop her own data. While there is some nominal cost associated with compiling the data, this cost is minimal in comparison with what it would cost to collect the data by implementing a survey with anywhere approaching the same frequency and coverage. In many cases, the publicly available data on the responsible entities' websites are sufficient. However, in this study, some interaction with agency staff has been required to obtain the needed data.

DISADVANTAGES OF ADMINISTRATIVE DATA SETS

The administrative data sets used in this dissertation are not without their disadvantages. One issue in working with the administrative data sets is that they do not include informal workers. Other limitations include such criticisms as the fact that these data only provide insight into pay income, leaving out all

other potential sources of income. However, as addressed in the literature review there are good reasons to focus on pay: it represents the single largest source of income of the majority of economically-active persons, and the data on employment and wages in these data sets still provide excellent insight into the relative health and performance of the various strata analyzed in this dissertation (primarily economic sectors and geographic regions).

In sum, the semi-aggregated data contained in these administrative datasets are sufficient for our purposes, and, whereas the household surveys have been used extensively, the fact that these data have not been used for analyzing inequality in the countries of study represents an additional advantage: working with these data provides the opportunity to develop new insights into the drivers of inequality.

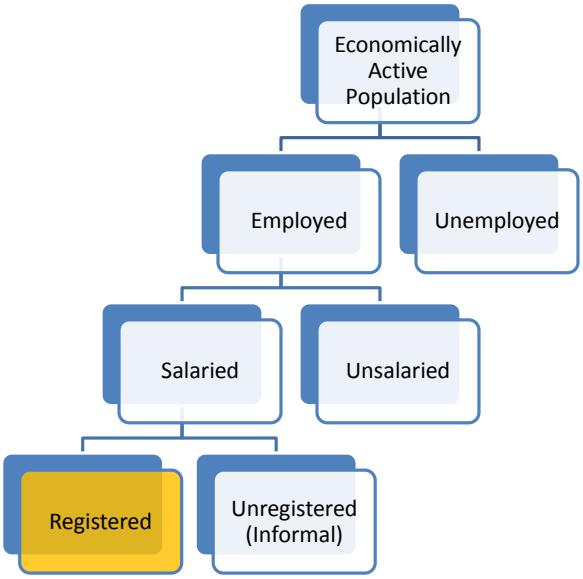
STUDY POPULATION: SALARIED WORKERS IN THE FORMAL ECONOMY

This study focuses on formal, salaried employees in the countries of study. The term 'formal' is used to describe labor that carries with it some form of social protections and/or the right to certain labor benefits.[44] In this dissertation specifically, based on the types of data used from the three countries of study, formal labor means the worker will receive a pension when he or she retires. These jobs are relatively stable and are generally full-time. Moreover, it is in this subgroup of the employed population that the institutions that govern the labor market (collective bargaining, minimum wage, etc) have their greatest impact.

[44] This is what authors call the "legalistic" definition of the divide between formal and informal labor. Others apply a "productive" definition that associates labor informality with low productivity (e.g. Gasparani and Tornarolli 2009).

Figure 4-1 shows this population as a subset of a country's economically active population.

Figure 4-1. Breakdown of Labor Market



Source: Adapted from MTEySS, 2009, p. 284.

By definition, none of the administrative data sets used in this dissertation include informal salaried workers. What follows from Figure 4-1 is that the data also do not provide wage information for the self-employed, including employers (except employers who also draw salaries from their businesses), own-account workers, and unpaid family workers.

Informal salaried workers represent an important portion of the salaried population of these countries. In general, the remuneration conditions of these workers are worse than those of formal workers. According to estimates derived from an employment survey performed by the National Statistics Institute of Chile (Instituto Nacional de Estadísticas de Chile, INE) for the third quarter of

2010, 71 percent of salaried workers in Chile (what we would considered formal workers) have written contracts and employment that is characterized as having a "high degree of protection:" they have health and unemployment insurance and participate in the national pension system. The remaining 29 percent are split between 16 percent without contracts (almost none of which receive any benefits) and 13 percent with written contracts, but varying degrees of protection (Instituto Nacional de Estadísticas 2010, p.10). Of the 11.3 million salaried workers in Argentina in the second quarter of 2009, 36.2 percent were not registered (Ministerio de Trabajo Empleo y Seguridad Social 2009, p.284). In Brazil, data from IBGE indicate that unregistered employment ranged between 24 and 30 percent of employment from 1992 to 2007 (Instituto Brasileiro de Geografia e Estatística 2008). For all three countries, these percentages do not fully explain informality: the overall size of the informal economies in each country also depends greatly on the amount of self-employment.

Justification for Focusing on the Formal Sector

It would obviously be preferable to have comprehensive data that include informal workers, but the lack of data in administrative registries on this portion of the economy is implicit in the nature of their employment: given that they are informally employed, they are not registered in their respective countries' pension systems, tax registries, nor included by their employers in regular business reporting of activities to the federal government. However, while the distinction between formal and informal employment may have several real and important consequences for individual workers, this dissertation does not focus on individuals and does not pretend to comment on those specific inequities.

Rather, this dissertation is focused on analyzing the dynamics of inequality, not its absolute levels, and as such requires data with sufficient resolution to reveal these trends: study of the formal sector as represented in the administrative datasets used provides this resolution.

Furthermore, the lack of data on the informal sector does not preclude this study from drawing inferences on the relative condition of the informally-employed. The formal and informal economies of a given country are subject to the same forces and cannot be isolated from each other.

Analysis of administrative data sets with Theil's T Statistic

Given the various advantages these administrative datasets provide, it is reasonable to ask why they have not been used more by researchers for commenting on inequality. Most studies of inequality rely on the gini coefficient for estimating inequality, which in turn requires individual data, which these administrative data sets do not provide. As such, another measure must be used, which is why this dissertation has turned to Theil's T statistic. Not only does Theil's T permit the estimation of overall pay inequality with semi-aggregated datasets, it also allows for decompositions according to the available groupings and subgroupings according to which the data are categorized – in this dissertation, economic sectors and geopolitical regions. The flexibility of Theil's T statistic allows this dissertation to present new measures based on previously un-used data of the evolution of pay inequality in Argentina, Brazil and Chile over the last fifteen to twenty years.

HOUSEHOLD SURVEYS

Throughout this dissertation, discussion of the calculated statistics is complemented with social indicators computed from household survey data. Official household surveys have been implemented across the period of study in all three countries; however, not only does each country have its own survey regime and periodicity, within the countries the surveys have changed in their coverage and periodicity, as explained in Table 4-1.

Table 4-1. Household Surveys by Country

Country	Years	Survey's name	Coverage
Argentina	1992-1998	Encuesta Permanente de Hogares (EPH)	Urban - 15 cities
	1998-2003	Encuesta Permanente de Hogares (EPH)	Urban - 28 cities
	2003-2005	Encuesta Permanente de Hogares - Continua (EPHC)	Urban - 28 cities
	2006-2009	Encuesta Permanente de Hogares - Continua (EPHC)	31 cities
Brazil	1990-2009	Pesquisa Nacional por Amostra de Domicilios (PNAD)	National
Chile	1990-2009	Encuesta de Caracterización Socioeconómica Nacional (CASEN)	National

COUNTRY-SPECIFIC DATA

The data from Argentina and Chile used for this study are derived directly from administrative records. The data for Brazil are slightly different: economic statistics are currently produced through the articulation of administrative records and business surveys. For all three countries, these registries contain information on employment and wages for salaried individuals employed in the formal sector, with data disaggregated by economic sector and geographically by regions, states (or provinces) and even municipalities (Brazil only). Specifically, the sources of data for each country are the following:

- **Argentina**: administrative registry of the Argentine Integrated Pension System (Sistema Integrado Previsional Argentino, or SIPA)[45,46], based on the information provided by the Federal Administration of Public Revenues (Administración Federal de Ingresos Públicos, or AFIP).
- **Brazil**: the Central Business Registry (Cadastro Central de Empresas, or CEMPRE), provided by IBGE.
- **Chile**: Administrative registry of the pension system provided by the Superintendency of Pension Fund Administrators (Superintendencia de Administradoras de Fondos de Pensiones, or SAFP).

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[45] Some changes were introduced to the Argentine Pension System in 2008. In December 2008, the Argentine Pension System was unified into a single state pension system by Law 26.425 creating the Argentine Integrated Pension System (SIPA — Sistema Integrado Previsional Argentino) in place of the Integrated Retirement and Pensions Scheme (SIJP — Sistema Integrado de Jubilaciones y Pensiones). The SIJP, which was in place from 1994 to 2008, offered workers the opportunity to make their personal retirement contributions into either the public or private pension system (SIPA, 2009).

[46] The SIPA is just one component of the social security system in Argentina, which is why it is not an exact corollary to American Social Security, and it is not translated as such.

Having broadly introduced the data used for this study, this section describes the specific data used for each country of study.

Argentina

The wage and employment information used in this study are taken from the administrative registries of the Sistema Integrado Provisional Argentino (SIPA). The SIPA data are compilations of the monthly tax filings of private and public entities at the Federal Administration of Public Revenues (Administración Federal de Ingresos Públicos, or AFIP). In these filings, each employer declares his or her employees in order to commit the payment of contributions to social security within the SIPA.

For this dissertation, SIPA data were obtained from two locations: the website of the Ministry of Economy, and bulletins published by the Labor, Employment, and Social Security Ministry (specifically, the ministry's Observatorio de Empleo y Dinámica Empresarial, or OEDE). The SIPA database includes employment and wage information for workers ages 18 and above employed in both public and private sector activities. Employers provide monthly reports, which are compiled into quarterly and annual statistics.

Table 4-2. Data Summary – Argentina

Source	SIPA
Type of data	Administrative record
Type of Reporting	Mandatory. Employer-submitted forms.
Frequency	Monthly (compiled into quarterly and annual statistics)
Classification of Economic Activity[47]	International Standard Industrial Classification of All Economic Activities, ISIC. Rev.3. Availability: Top-level (letters) and 2- & 3-digit codes.
Geographical break-down	Argentinean provinces + Buenos Aires City
Geographic coverage	Whole country
Population (coverage)	Registered public and private salaried employees.*
Period	1994 – 2007
Type of Income	Gross average wage

* Data do not include public sector employees of those provinces that did not transfer their employees' social security into SIPA.[48]

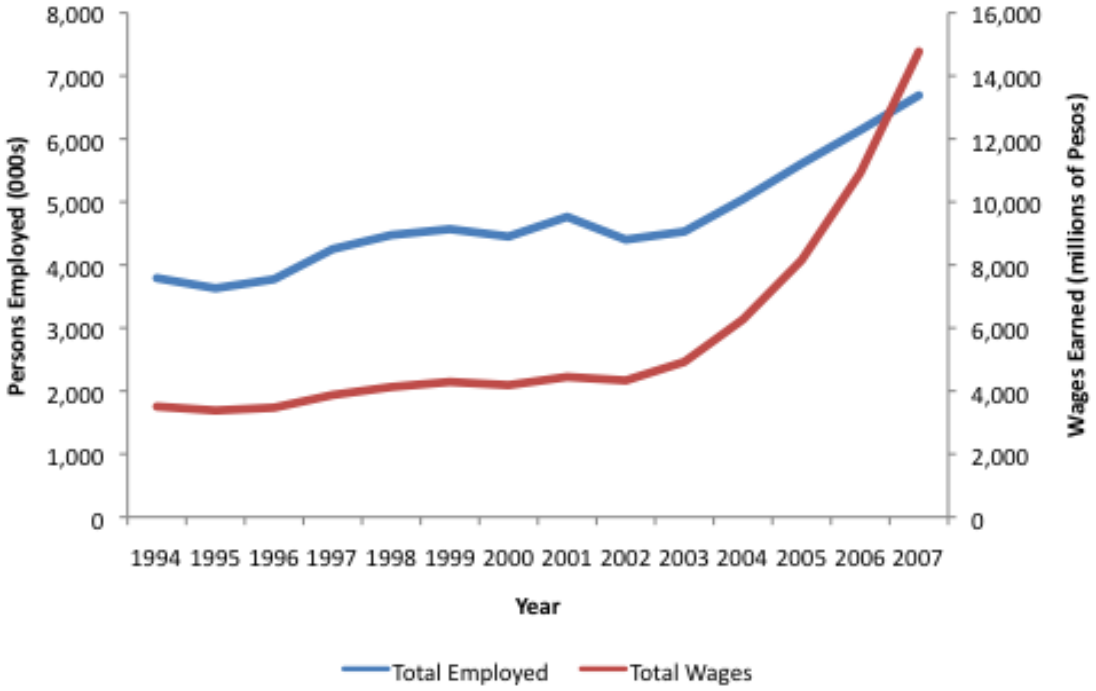
Salaried Positions and Wages

By 2007, there were almost 6.7 million jobs declared to SIPA. Those salaried workers earned about 15 billion pesos, as shown in Figure 4-2.

[47] According to the OEDE, the primary area of economic activity to which each business is ascribed is originally classified in accordance with employers' categorizations in AFIP declarations. OEDE improves upon these classifications using other sources, primarily the Survey of Labor Indicators (EIL), business guides, and consultations with chambers and regulatory agencies, as well as other business registries.

[48] The data do not include persons employed in the public sector who work for the provincial governments of those provinces that did not transfer the administration of their employee benefits to the national system, including the following 13 provinces: Buenos Aires, Santa Fe, Córdoba, La Pampa, Entre Ríos, Corrientes, Misiones, Chaco, Formosa, Neuquén, Chubut, Santa Cruz y Tierra del Fuego. Of these, the provincial governments of Buenos Aires, Córdoba and Santa Fe are significant in size.

Figure 4-2. Argentine Employment and Total Wages

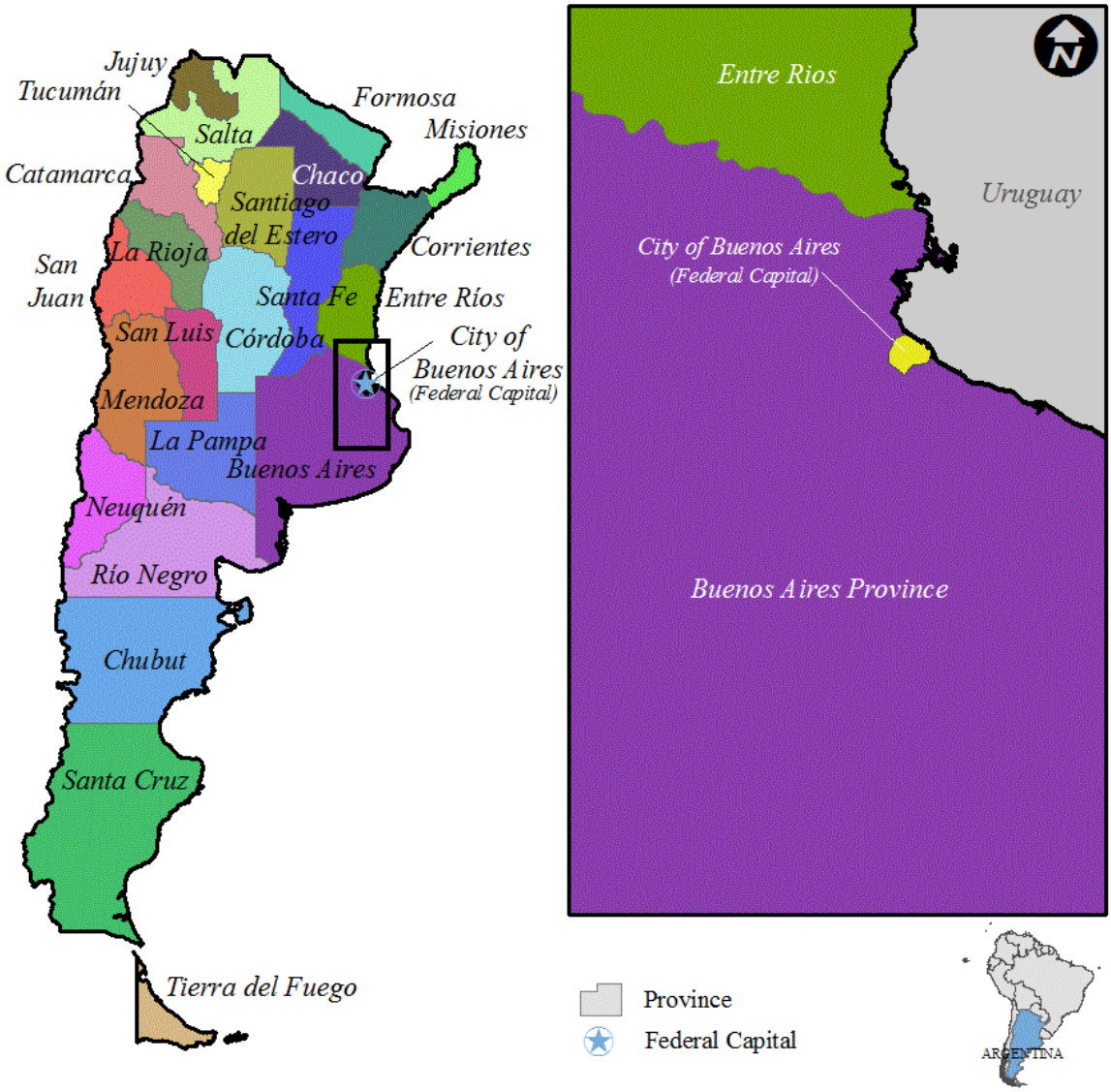


Source: Author's calculation based on SIPA data.

Explanation of economic sectors and geographic units

These salary and employment data allow for calculation of the yearly Theil's T statistic by economic sector and geographic unit at the provincial level. Argentina is further subdivided into twenty-three provinces and one autonomous city, the City of Buenos Aires (Ciudad Autónoma de Buenos Aires, or CABA), formerly a federal district, as shown in Figure 4-3.

Figure 4-3. Argentine Geographic Coverage (Provinces)



Source: Author.[49]

[49] This map, other maps showing the geopolitical divisions of the countries of study, and all geographic projections of the author's calculations presented in this dissertation, were prepared with the assistance of Shawn Strange.

Economic Sectors

Areas of economic activity within the data for Argentina are organized using Revision 3 of the International Standard Industrial Classification of all Economic Activities (ISIC), as maintained by the United Nations. The same classifications are maintained across the period of study. Top level classifications are presented in Table 4-3. While the data are also available at the two and three-digit classification levels with 56 and 141 subgroupings, respectively,[50] this is the level of aggregation at which data are most comparable between countries.

Table 4-3. High-level divisions of Argentine Economic Sectors

1	Agriculture, Livestock, Hunting and Forestry
2	Fishing and Related Services
3	Mining and Quarrying
4	Food, Beverage and Tobacco
5	Manufacture of Textiles and Leather
6	Wood, Paper, Printing and Publishing
7	Petroleum Derivatives and Chemicals
8	Basic Metals, except Machinery and Equipment
9	Transport Material
10	Machinery and Equipment
11	Other Manufacturing
12	Supply of Electricity, Gas and Water
13	Construction
14	Wholesale & Retail Trade and Workshops
15	Hotels and Restaurants
16	Transport, Storage and Communications
17	Financial Intermediation
18	Real Estate, Business Services and Rentals
19	Public Administration, Defense and Extraterritorial

[50] A complete listing of the 56 two-digit level and 141 three-digit level subsectors is available on the OEDE website.

	Organizations and Bodies
20	Social Services, Private Education and Health
21	Other Community, Social and Personal Services
22	Unclassified

Brazil

The semi-aggregated data for Brazil come from the Central Business Registry (CEMPRE) of the Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica, or IBGE). Since the second half of the 1990s, Brazil has been using CEMPRE to generate official economic statistics. Prior to this, these statistics were obtained through an economic census carried out every 5 years. The key element of this "new" system is the business registry, which is systematically updated with both survey and administrative data (Cardoso and Ribeiro 2008).

The CEMPRE contains data for all legal enterprises and other formal organizations in Brazil.[51] CEMPRE is updated combining information from four sources: (1) the Annual Report of Social Information (Relação Anual de Informações Sociais, or RAIS[52]), (2) the General Registry of Employment and Unemployment (Cadastro Geral de Empregados e Desempregados, or (CAGED)),[53] (3) annual sample surveys conducted by IBGE in manufacturing, construction, trade and services and, to a limited extent (4) the National Registry

[51] CEMPRE includes enterprises, public sector organizations, and non-profit organizations formally constituted in Brazil.

[52] More detailed information on RAIS can be accessed at: http://www.mte.gov.br/rais/default.asp.

[53] CAGED is a form that must be completed monthly by the companies with any movements of hiring and firing of staff. The General Register of Employed and Unemployed Persons – CAGED, was instituted by the Law nº 4.923, in 1965. More detailed information on CAGED can be accessed at: http://www.mte.gov.br/caged/default.asp.

of Legal Entities (CNPJ) from the Ministry of Finance (Cardoso and Ribeiro 2008).

The most important source of information used to update CEMPRE is the RAIS.[54] RAIS is an administrative data set put together by the Ministry of Labor and Employment, (Ministério de Trabalho e Emprego, or MTE) updated annually and mandatory for all companies in the country, both public and private. It is one of the main sources of information on the formal labor market in Brazil: with a coverage of almost 97% of registered firms, RAIS has effectively become a census of the Brazilian formal labor market (Ministério do Trabalho e Emprego 2010, p.5).

Table 4-4. Data Summary –Brazil

	CEMPRE Data Source		
	RAIS	CAGED	SURVEYS
Type of data	Administrative record	Administrative record	Survey
Type of Reporting	Mandatory. Employer-submitted forms.	Mandatory. Employer-submitted forms.	Self-Reporting
Frequency	Annual	Monthly, biannual receipt	Annual
Classification of Economic Activity[55]	CNAE	CNAE	CNAE

[54] De Negri *et al.* (2001) performed a detailed comparison between RAIS data and household survey data (PNAD), in which they concluded that the RAIS data are trustworthy and tend to provide results similar to those obtained with PNAD data for the Brazilian labor market.

[55] Brazil began the revision of their industrial classification in 1993 responding in part to the growing demand for standardized statistics worldwide and since 1995 the National Industry Classification of all economic activities (CNAE) has been put in place. This classification system

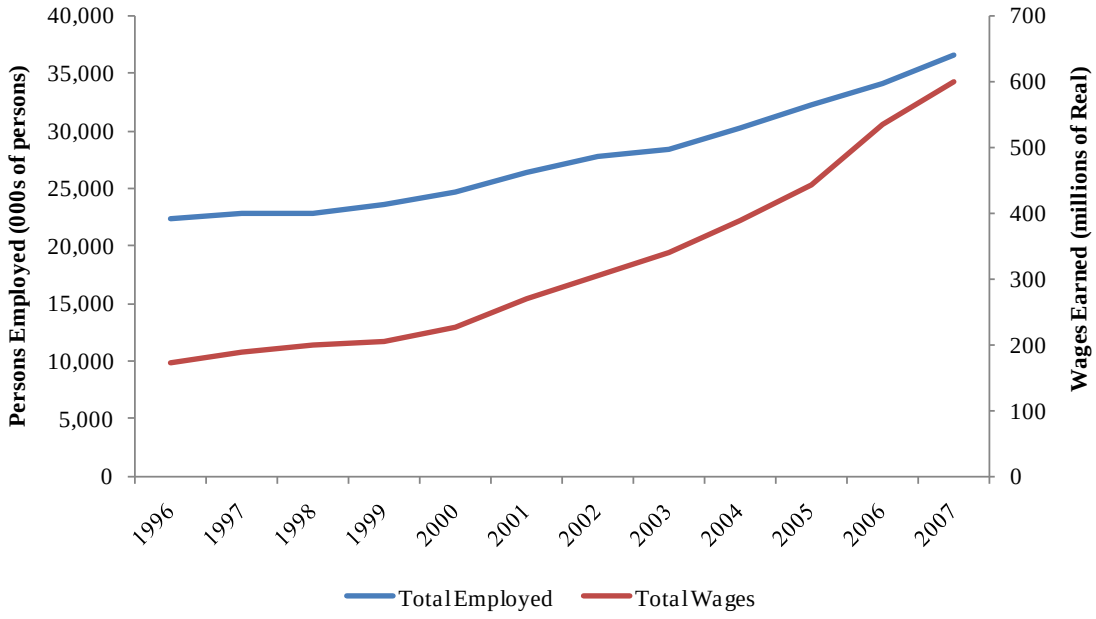
	CEMPRE Data Source		
	RAIS	CAGED	SURVEYS
(Availability: Top level letters)			
Geographic break-down:	Brazil, natural regions, mesoregions microregions, Federal Units and municipalities	Brazil, natural regions, mesoregions microregions, Federal Units and municipalities	
Geographic coverage	Whole country	Whole country	Whole country
Population coverage	Approx. 99.9% of active records. (It represents 97% of the Brazilian formal sector).	More than 90% of registers.	Approx. 5% of active registers. In 2006: approx. 211,000 enterprises that are responsible for 80% of working employees in these sectors: manufacturing, construction, trade and services.
Period	1996 - 2007		
Type of Income (CEMPRE)	Gross Taxable Wages		

was derived in that moment from the international classifications International Standard Industrial Classification of All Economic Activities (ISIC) rev. 3.0 (Bianchini 2003).

Salaried Positions and Wages

For 2007, the last year in the series, CEMPRE contained information on 4.7 million local entities, which employed 36.7 million (86 percent) people in salaried positions. Those salaried workers earned R$601.4 million, as shown in Figure 4-4.

Figure 4-4. Brazilian Employment and Total Wages



Source: Author's calculations based on CEMPRE data.

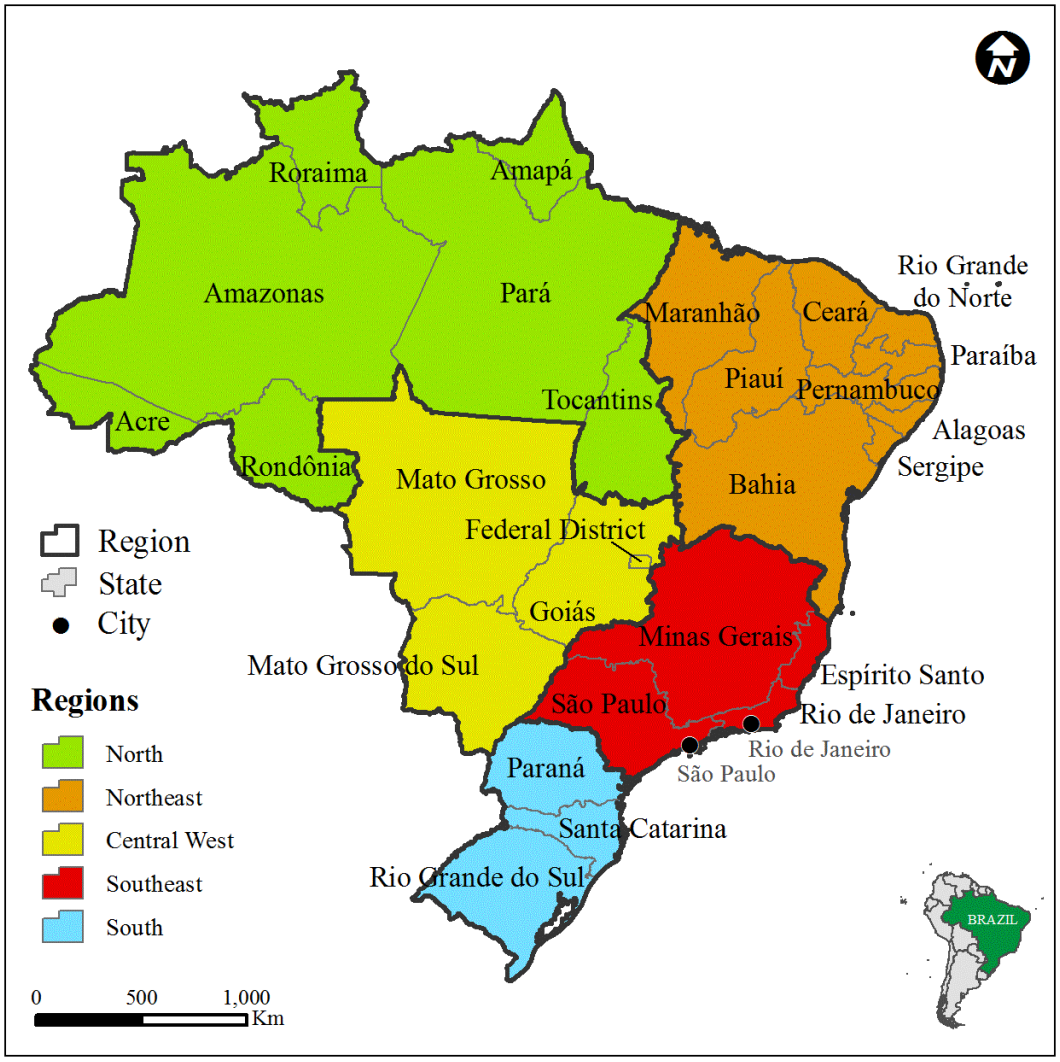
Explanation of economic sector and geographic units

These salary and employment data allow for calculation of the yearly Theil's T statistic by economic sector (15 sectors) and geographic unit at the regional and state level between 1996 and 2007. Furthermore, the statistic can be calculated at the municipal level from 2001 to 2007. IBGE divides Brazil into five regions: (1) North (2) Central-West (3) Southeast (4) South and (5) Northeast. Administratively, the Federative Republic of Brazil is a union of twenty-six states

plus the Federal District. The Federal District is frequently referred to as Brasília; however, administratively, Brasilia and the Federal District are not the same entity. The city of Brasilia is the most important administrative region within the Federal District.[56] Finally, at the municipal level, as of December 2007 Brazil had 5,564 municipalities.

[56] Unlike the other states, which are divided in municipalities, the Federal District is divided in administrative regions.

Figure 4-5. Brazilian Geographic Coverage (Regions and States)



Source: Author.

Own Adjustments

Despite the numerous advantages of using this type of semi-aggregated data, methodological changes in the collection and classification of the data require some adjustments so the series can be extended beyond 2006 with a

consistent set of groups.[57] Specifically, IBGE adopted CNAE 2.0 in 2007, expanding its classification from 16 to 21 economic sectors. There are 15 sectors that consistently represent the groupings of sectors in both CNAE 1.0 and CNAE 2.0, as shown in Table 4-5, that permit a consistent characterization of the economic sectors in Brazil across the period of study.[58]

Table 4-5. Classifications of Brazilian Economic Sectors

Sectors (CNAE 1.0) 1995 - 2006	Combined Sectors (CNAE 1.0/2.0) *	Sectors (CNAE 2.0) 2006 – 2007
1. Agriculture, Livestock, Hunting and Forestry	Agriculture, Livestock, Hunting, Forestry, and Fishing	A Agriculture, Livestock, Hunting, Forestry, and Fishing
2. Fishing		
3. Mining and Quarrying	Mining and Quarrying	B Extractive Industries
4. Manufacturing Industries	Manufacturing Industries	C Manufacturing Industries
5. Supply of Electricity, Gas and Water	Supply of Electricity, Gas and Water	D Electricity and gas
		E Water, sewer, and solid waste
6. Construction	Construction	F Construction
7. Wholesale & Retail Trade and Repair Workshops	Wholesale & Retail Trade and Repair Workshops	G Wholesale & Retail Trade and Repair Workshops
8. Hotels & Restaurants	Hotels & Restaurants	I Hotels & Restaurants

[57] Since 1995, the first time Brazil introduced the National Industry Classification of all economic activities (CNAE) two major revisions of the CNAE were introduced since then. The first one - CNAE 1.0 -was implemented in 2002 and was based on ISIC Rev3.1 and the second one - CNAE 2.0- was implemented in 2007 and is closely linked to the UN's revision 4 of ISIC.

[58] To make comparisons easier, IBGE released data for the year 2006 using both classifications CNAE 1 and CNAE 2.

Sectors (CNAE 1.0) 1995 - 2006	Combined Sectors (CNAE 1.0/2.0) *	Sectors (CNAE 2.0) 2006 – 2007
9. Transport, Storage and Communications	Transport, Storage and Communications	H Transport, Storage and Communications
		J Information and Communications
10. Financial Intermediation, Insurance and Related Services	Financial Intermediation, Insurance and Related Services	K Financial Intermediation, Insurance and Related Services
11. Real Estate, Rentals and Business Services	Real Estate, Rentals and Business Services	L Real Estate
		M Professional activities, scientists and technicians
		N Administrative activities and business services
12. Civil Service, Defense and Social Security	Civil Service, Defense and Social Security	O Civil Service, Defense and Social Security
13. Education	Education	P Education
14. Health and Social Services	Health and Social Services	Q Health and Social Services
15. Other Collective, Social and Personal Services	Other Collective, Social and Personal Services	R Arts, culture, sports and recreation
		S Other Service Activities
		T Domestic Services
16. International and Extraterritorial Organizations	International and Extraterritorial Organizations	U International and Extraterritorial Organizations

Chile

Wage and employment data are available from the administrative registries of the Chilean Pension System. Specifically, this dissertation makes use

of administrative data from the Superintendency of Pension Fund Administrators (SAFP). The information comes from the Quarterly Statistical Report of participants and contributors in the SAFP, based on data provided by the Pension Fund Administrators (Administradoras de Fondos de Pensiones, or AFP). The AFP databases contain data aggregated by quarter (as it appears in the website).[59]

Within the universe of pension contributors, this dissertation considers only those workers that make payments into the AFP – the privatized system – and not those who continue to contribute to the legacy public system run under the auspices of the Institute of Pension Settlements (Instituto de Normalización Previsional, or INP).[60]

The total number of contributors to the public and private systems in September of 2009 was just over 4 million: by that time, there were fewer than 100,000 persons still making contributions to the public system, meaning that over 97.5 percent of salaried Chileans participating in the pension system were in the private system.

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[59] Salary data obtained from this administrative registry have been used primarily in studies whose principal objective was to analyze the convergence of salaries between different regions of Chile (Dresdner and Sanhueza 2009; Sanhueza Sánchez 2009; Tramón and Dresdner 2004). Other studies have also taken up the subject of salary convergence, but have used other data sources, such as salaries as provided by the Chilean Security Association (ACHS, by its Spanish abbreviation) (see Díaz and Meller 2004).

[60] With the implementation of the decree – law 3500 in 1981, the privatization of the Chilean system began, at which point the administration of pension funds was passed into the hands of private firms, called pension fund administrators (AFP). From this point forward, new workers entering the labor force did not have access to the legacy public system, but had to select an AFP. Only those workers who had previously participated in the INP could choose to continue making contributions to the public system, or could choose to switch over to the new, private system. The "Instituto de Normalización Previsional" (INP) was created to oversee the transition to the new system. For a detailed analysis of the Chilean Pension System see Macías, Mastrangelo *et al.* 2003.

Table 4-6. Contributors to the Chilean Private Pension System

Contributor Type	Count	Percentage
Salaried	4,056,452	98%
Self-Employed	86,123	2%
Voluntary Contributors	2,202	0%
TOTAL	4,144,777	100%

Source: SAFP Quarterly Statistical Report of Affiliates and Contributors, June 2010 (Q2).

Contributors to the AFP include dependents (salaried workers), independents (self-employed), and voluntary contributors. Participation in the system is mandatory for dependent workers, and optional for the self-employed. As shown in Table 4-6, dependents make up almost 98 percent of all contributors.

Table 4-7. Data Summary - Chile

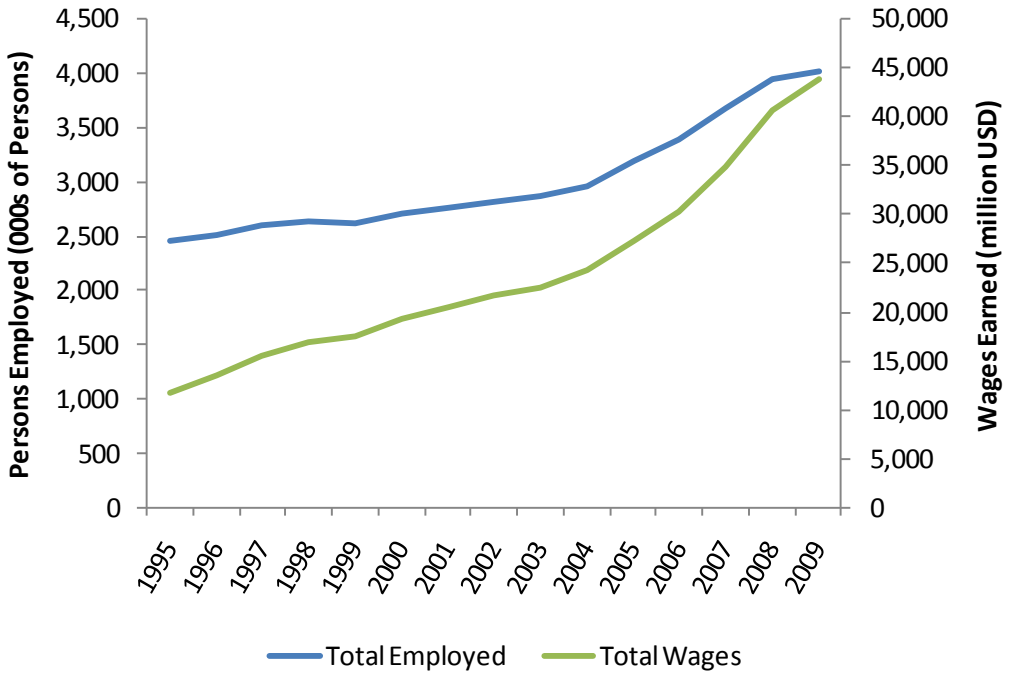
Source:	Superintendency of Pension Fund Administrators (SAFP)
Type of data	Administrative record
Type of Reporting	Mandatory - Employer-submitted forms
Frequency (reporting)	Monthly (compiled into quarterly statistics)
Classification of Economic Activity	International Standard Industrial Classification of All Economic Activities. Availability: Top-level (letters)
Geographical break-down:	Chilean regions (15 regions, comparable to the provinces and states of Argentina and Brazil)[61]
Geographic coverage	Whole country
Population (coverage)	All salaried employees contributing to private AFP pension funds and those self-employed individuals that opt to contribute into the system.
Period	1995 - 2010
Type of Income	Gross (taxable) wages

[61] Regions in the case of Chile are comparable to the provincial and state level for Argentina and Brazil respectively.

Salaried Positions and Wages (last year in the series)

In 2009, the SAFP received information on over 4 million persons making contributions to the Chilean social security system, whose total taxable income totaled just under $44 million (USD).

Figure 4-6. Chilean Employment and Total Wages



Source: Author's calculation based on SAFP data.

Explanation of economic sector and geographic units

These salary and employment data allow for calculation of the quarterly and annual Theil's T statistic by economic sector and geographic unit at the regional level between 1995 and 2010. Chile is divided into 15 regions, which are most comparable to the states and provinces in Brazil and Argentina. Each

region is assigned a roman numeral, originally assigned in order from north to south, with the exception of the metropolitan region. Originally, the country was divided into 13 regions, but two new regions were added in October 2007: Los Ríos (XIV) and Arica-Parinacota (XV). This is the most disaggregated geographic level in Chile with which this dissertation is concerned.

Own Adjustments

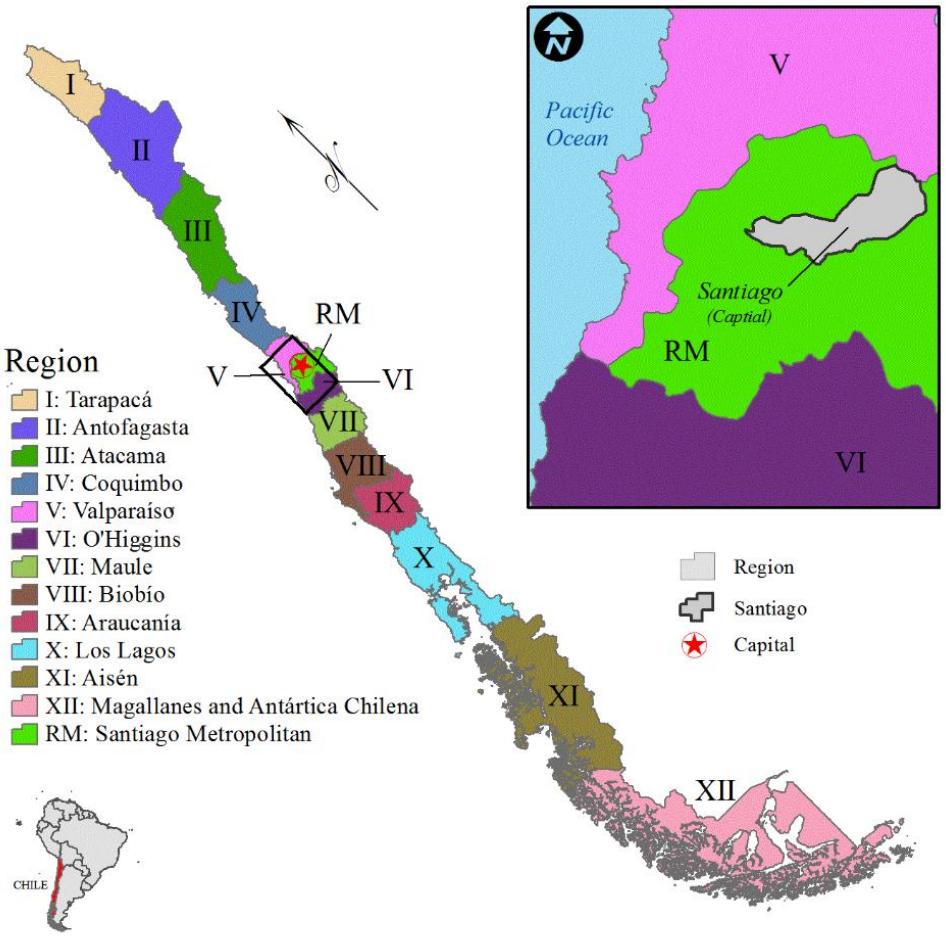
Regional adjustment: To maintain regional consistency across the period of study, the creation of Los Rios (region XIV) and Arica-Parinacota (region XV) in October 2007 is ignored. These two regions were carved out from Los Lagos (Region X) and Tarapacá (Region I), respectively: for the calculations in this dissertation, the employment and wages from the Los Rios region are added back into those of Los Lagos, and the same data from Arica-Parinacota are returned to Tarapacá, as though nothing had changed. As such, the dissertation treats Chile as though it had maintained the same 13 regions for the entire period of study.

Sectoral Adjustments

The sectoral structure of the data from Chile changed in the third quarter of 2006. Where previously data were aggregated into 9 sectors and 2 unclassified groups, the new structure included 19 groups. In the original structure, a large number of businesses, and consequently their employees, were classified as "unspecified activity and others." When the change was implemented in 2006 and a more comprehensive classification scheme put in place, the "unspecified activity" category ceased to exist: wage earners previously in this group were distributed among the new classifications. The nature of this change renders it

impossible to merge the two classification schemes, so two separate groupings are developed for Chile: the original 9 sectors between 1990 and 2006, and the expanded 19 sectors from 2006 to 2010.

Figure 4-7. Chilean Geographic Coverage (Regions)



Source: Author.

Specific Data Limitations - Chile

As described above, the administrative data available for Chile are a series of salaries maintained by the SAFP from 1995 to 2010, representing the earnings of those Chilean workers whose wages are subject to governmental withholdings for the social security system. The main limitation of the reported data is that salaries are only reported up to a certain amount, as earnings above this limit are not subject to social security withholdings. In 2010, this cap was set at 64.7 UF.[62] This means that actual salaries for all workers earning above this limit are not known; as such, average salaries are likely underestimated, especially for high-wage sectors (e.g. mining, finance, utilities).

Advantages of Chilean Data Set

However, this data set presents clear advantages over other data available for studying Chilean income distribution. As with all the administrative data sets used in this dissertation, it has a large sample size and good periodicity. Furthermore, given the use of similar administrative data sets for Argentina and Brazil, using survey data (such as the CASEN or income statistics derived from the National Institute of Statistics (Instituto Nacional de Estadísticas, or INE) for Chile would provide a completely different perspective, introducing noise to the analysis and limiting the usefulness of comparison between Chile and the other two countries of study.

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[62] The Unidad de Fomento (UF) was created in Chile in 1967. It is an inflation-indexed unit of account adjusted daily since 1977 based on variations in the Consumer Price Index (Indice de Precios al Consumidor or IPC) to have a consistent value over time in real terms. According to the Chilean Central Bank's website as of December 3rd, 2010, 1 UF was equivalent to 21,436 Chilean pesos and 1 USD was equivalent to 484 Chilean pesos, so the cap on taxable monthly income in 2010 is equivalent to 1,387,000 Chilean pesos, or about 2,900 US dollars.

Above all, given the universe of study (formally-employed salaried workers), this data set provides the greatest coverage: according to INE's New National Survey of Employment, there were just over 4.1 million formally-employed, dependent workers (known as 'contrato escrito' or 'written contract' in Chile) in the third quarter of 2010. In the SAFP data used for this analysis, there are 4.06 million salaried contributors to the state withholdings system at this time, representing 99 percent of this population. As such, this data set provides excellent coverage of salaried, dependent workers.

In summary, the data utilized in this research is, simply, the best statistical data series available for analyzing this study's target population: salaried, formally-employed workers. There is, simply, no other systematically organized data series for the countries of study that can replace the data utilized herein. Among the key advantages of these comprehensive data sets, they are produced by public agencies that are among the most professional in the countries of study. Having laid the foundation of historical context, the works of previous researchers and their methods, and the particular advantages of the methods and data selected for this dissertation, the dissertation proceeds to present the findings of the single-country studies of Argentina, Brazil, and Chile.

References

Adair, Craig. 2006. "Structural Change, Inequality, and Growth in Mexico." UTIP Working Paper No. 35, The University of Texas, Austin, Texas.

Bianchini, Zélia Magalhães. 2003. "Quality Issues and Initiatives at the Brazilian Institute of Geography and Statistics." in *OECD/IMF Workshop on Assessing and Improving Statistical Quality*. Paris, France.

CAGED. "Cadastro Geral de Empregados e Desempregados" Available at http://www.mte.gov.br/caged/default.asp.

Cardoso, Sidnéia Reis and Ana Rosa Pais Ribeiro. 2008. "The use of administrative data for the production of official economic statistics in Brazil: current situation and challenges for the future." in *International Association for Official Statistics Conference on Reshaping Official Statistics*. Shanghai, China.

CEDLAS. 2010. "Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank): Methodological Guide." Center for Distributional, Labor and Social Studies, Buenos Aires, Argentina.

De Negri, João Alberto, Paulo Furtado de Castro, Natalia Ribeiro de Souza, and Jorge Saba Arbache. 2001. "Mercado Formal de Trabalho: Comparação entre os Microdados da RAIS e da PNAD " Working Paper No. 840, Instituto de Pesquisa Econômica Aplicada (IPEA), Brasília.

Díaz, Rodrigo and Patricio Meller. 2004. "Crecimiento Económico Regional en Chile: ¿Convergencia?" Working Paper Nº 180, Centro de Economía Aplicada, Universidad de Chile, Santiago, Chile.

Dirección Nacional de Programación Macroeconómica. "Información Económica al Día: http://www.mecon.gov.ar/peconomica/basehome/infoeco.html." Ministerio de Economía y Finanzas Públicas, Buenos Aires, Argentina.

Dresdner, Jorge and Carlos Sanhueza. 2009. "Estimación de Series de Salarios Regionales en Chile." UdeC Working Paper No. 7, Universidad de Concepción (UdeC), Concepción, Chile.

Du Pin Calmon, Paulo, Pedro Conceição, and James K. Galbraith. 1999. "Inequality and Industrial Wage Change in Brazil." UTIP Working Paper No.12, University of Texas, Austin, Texas.

Du Pin Calmon, Paulo, Pedro Conceição, James K. Galbraith, Vidal Garza Cantú, and Abel Hibert. 2000. "The Evolution of Industrial Earnings Inequality in Mexico and Brazil." *Review of development economics* 4(2):194-203.

Galbraith, James K. and Vidal Garza Cantú. 1999. "Grading the Performance of the Latin American Regimes 1970-1995." UTIP Working Paper No.10, The University of Texas, Austin, Texas.

Galbraith, James K., Laura Spagnolo, and Daniel Munevar. 2008. "Inequidad Salarial en Cuba durante el Periodo Especial " *América Latina Hoy* 48:109-138.

Galbraith, James K., Laura Spagnolo, and Sergio Pinto. 2007. "Economic Inequality and Political Power: A Comparative Analysis of Argentina and Brazil." *Business and Politics* 9(1).

Gasparini, Leonardo and Leopoldo Tornarolli. 2009. "Informalidad laboral en America Latina y el Caribe: patrones y tendencias a partir de microdatos de encuestas de hogares." *Desarrollo Y Sociedad* 63:13-80.

INDEC. 2003. "La nueva Encuesta Permanente de Hogares de Argentina." Instituto Nacional de Estadística y Censos (INDEC), Buenos Aires, Argentina.

Instituto Brasileiro de Geografia e Estatística, (IBGE). 2008. "Série PD153 – População de 10 ano ou mais idade, empregada, por categoría do emprego (trabalho principal). ." Pesquisa Nacional por Amostra de Domicílios 1992/2007.

Instituto Nacional de Estadística y Censos (INDEC). 2006. "Generación del Ingreso e Insumo de Mano de Obra. Fuentes, métodos y estimaciones. Años 1993 – 2005."

Instituto Nacional de Estadísticas (INE). 2010. "Empleo Trismestral." Boletín Informativo del Instituto Nacional de Estadísticas No. 144, Santiago, Chile.

Macías, Osvaldo Jorge Mastrángelo, Marcia Miranda, José Luis Ruiz, Marcia Salinas, and Dagoberto Valenzuela. 2003. "The Chilean Pension System." Superintendency of Pension Fund Administrators, Santiago, Chile.

Ministerio de Trabajo Empleo y Seguridad Social, (MTEySS). 2009. "Teorías económicas y políticas públicas frente a la crisis global." Revista de Trabajo No. 7, Ministerio de Trabajo, Empleo y Seguridad Social, Buenos Aires, Argentina.

Ministério do Trabalho e Emprego, (MTE). 2010. "Registros Administrativos RAIS e CAGED." Brasília, Brazil.

Observatorio de Empleo y Dinámica Empresarial (OEDE). "Series Estadísticas Disponibles: http://www.trabajo.gov.ar/left/estadisticas/oede/estadisticas.asp." Ministerio de Trabajo, Empleo y Seguridad Social de la Nación, Buenos Aires, Argentina.

RAIS. "Relação Anual de Informações Sociais" Available at http://www.mte.gov.br/rais/default.asp.

SAFP. "Superintendencia de Administradoras de Fondos de Pensiones" Available at http://www.spensiones.cl/safpstats/stats/.

Sanhueza Sánchez, Carlos. 2009. "Convergencia de Salarios entre las Regiones de Chile, en el Periodo 1994-2003." Magíster en Economía de Recursos Naturales, Universidad de Concepción.

Sistema Integrado Previsional Argentino (SIPA). 2009. Available at: http://www.safjp.gov.ar/principal.htm, Buenos Aires, Argentina.

Spagnolo, Laura and Daniel Munevar. 2008. "After Years of (Economic) Solitude: Neoliberal Reforms and Trends in Manufacturing Sector Pay Inequality in Colombia." UTIP Working Paper No. 47, The University of Texas, Austin, Texas.

Tramón, María Loreto and Jorge Dresdner. 2004. "¿Convergen los Salarios Regionales en Chile?" *Economía y Administración, Universidad de Concepción* XLI(62):7-31.

Chapter 5: Argentina

The chapter begins with a review of the literature on income inequality in Argentina, presenting three measures of income inequality as estimated by CEDLAS for the years 1992-2010: the gini coefficient, the ratio of the top (richest) decile's mean income to that of the bottom (poorest) decile, and, finally, the share of total income by decile during the same period. The chapter also presents a brief review of the determinants of observed levels of income inequality since the mid-1970s as discussed in the academic literature.

The chapter organizes around presentation of original estimates of pay inequality in Argentina from 1994 to 2007, using administrative data organized by economic sectors and geographic regions to estimate the between-groups and within-groups components of Theils' T statistic. This dissertation's calculations and analysis are presented in two sections: the first of these sections focuses on the inequality between economic sectors, while the following section discusses trends in geographical inequality. Finally, preliminary conclusions are presented.

Evolution of Income Inequality in Argentina and its Determinants

During most of the 20th century Argentina had one of the most egalitarian economies in Latin America. Inequality was relatively moderate during the 1950s and 1960s, and it remained at those levels until the first part of the 1970s (Altimir 1986). For that historical period (1950-1975), the most studied distribution was the functional distribution of income: studies concentrated exclusively on discussions of the share of total income accruing to wage earners (Monza 1973; Diéguez and Petrecolla 1974; De Pablo 1977; Orsatti 1983), among others.

Beginning around 1975, there was a structural change in the Argentine economy that brought about a progressive worsening of the distribution of income, about which there is broad consensus in the literature (Altimir 1986; Beccaria and Orsatti 1986; Beccaria 1991), among others. The contributions of two particularly important events to this growing and persistent trend must be recognized: (1) the hyperinflation of 1989, and (2) the crisis of December 2001. As the crisis that began in 2001 persisted into 2002, inequality reached its highest level in Argentina's history. Although inequality has since decreased, the current distribution of income remains very unequal (Galbraith, Spagnolo *et al.* 2007; Groisman 2008), among others.

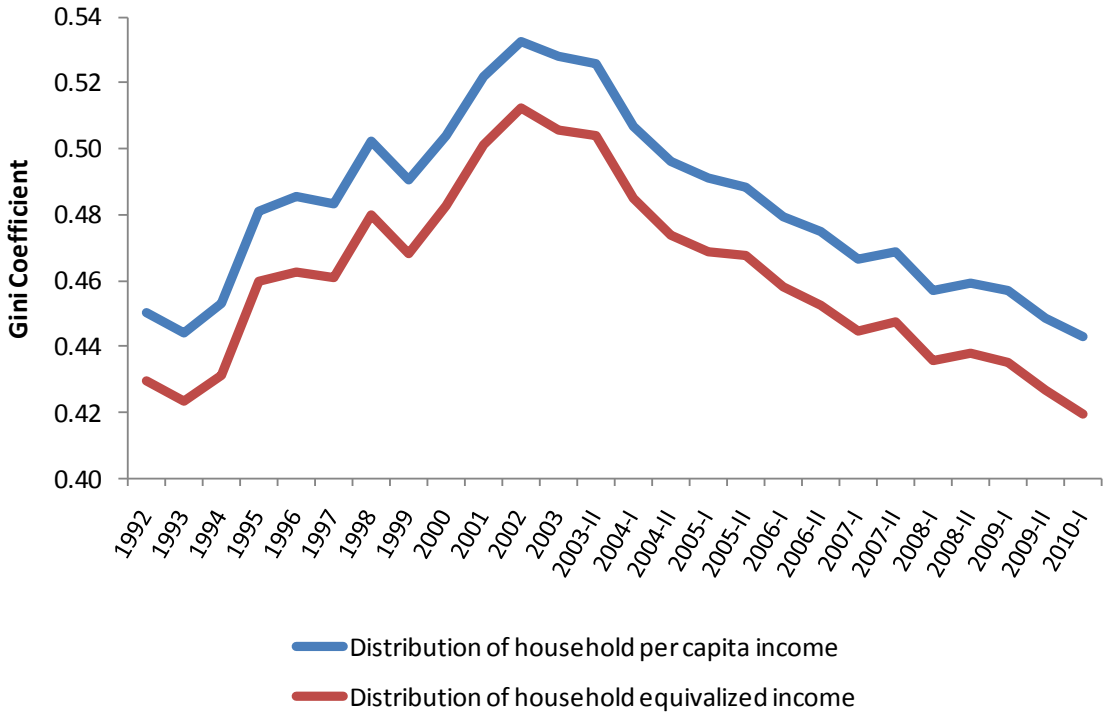
This section presents the Gini coefficients for the distribution of household per capita income[63] and for the distribution of household equivalized income based on microdata from the Argentine household survey.[64] According to the results of the Argentine permanent household survey (EPH) implemented by INDEC, two clear trends have emerged since the beginning of the nineties. As shown in Figure 5-1, both the distribution of household per capita income and the distribution of household equivalized income rose during the 1990s and early 2000s (peaking in 2002), followed by a generally decreasing trend. Inequality in the distribution of household per capita income, as estimated with the Gini coefficient, began the period at about 0.45, rose to 0.53 in 2002, and fell back to

[63] In Spanish, "distribución del ingreso per cápita familiar." The household per capita income is obtained by dividing the total household income by the number of members of the household. This variable ignores three relevant facts: (1) the existence of economies of scale in household consumption, (ii) the differences in needs between individuals, basically in function of their age and gender, and (iii) the unequal assignment of resources within the household (CEDLAS 2010, p. 23-24).

[64] In Spanish, "distribución del ingreso familiar equivalente."

0.44 in 2010. At the peak, Argentine inequality was approaching the higher end of the spectrum of Latin American inequality - despite the seven-year decrease at the end of the period, the level of inequality in 2010 is practically the same as that observed in 1992, however it would be considered a low to average level of inequality as compared to other countries in the region.

Figure 5-1. Gini Coefficient for Argentina between 1992 and 2010

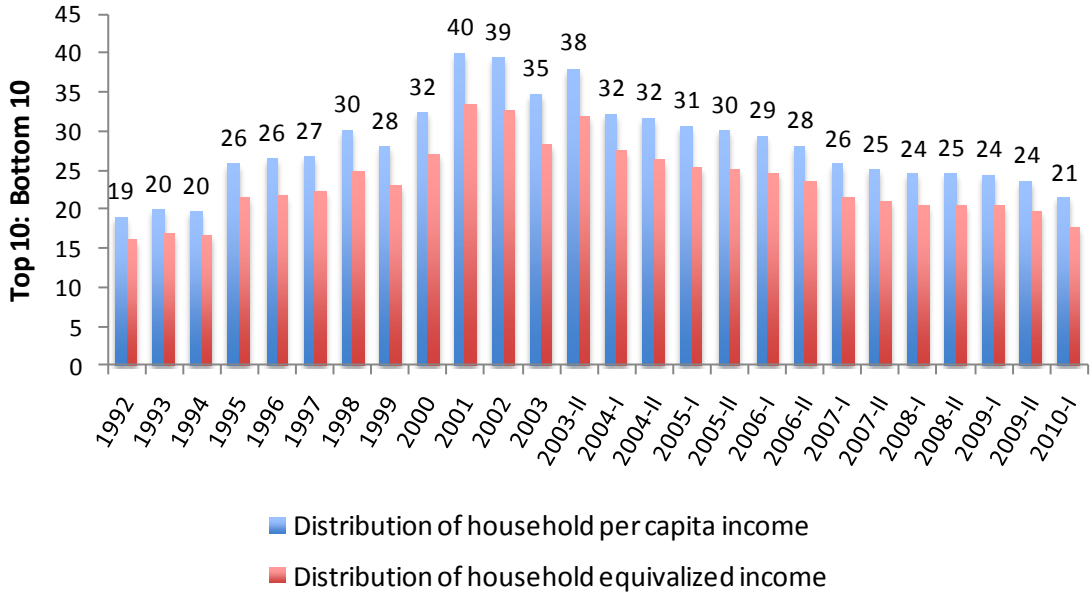


Source: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank).[65]

[65] From 1992-1998, the survey covered 15 cities. From 1998-2003, the survey covered 28 cities, and has covered 31 cities since 2006. As explained in detail in the Data chapter INDEC began the Continuous Permanent Household Survey in 2003 allowing for quarterly, semi-annual, and annual estimates (INDEC 2003).

To illustrate another aspect of the Argentine income distribution since 1992, Figure 5-2 shows the ratio of mean income of the 10th decile to that of the first decile.

Figure 5-2. Argentine Income Ratios (10/1)[66] between 1992 and 2010



Source: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank).

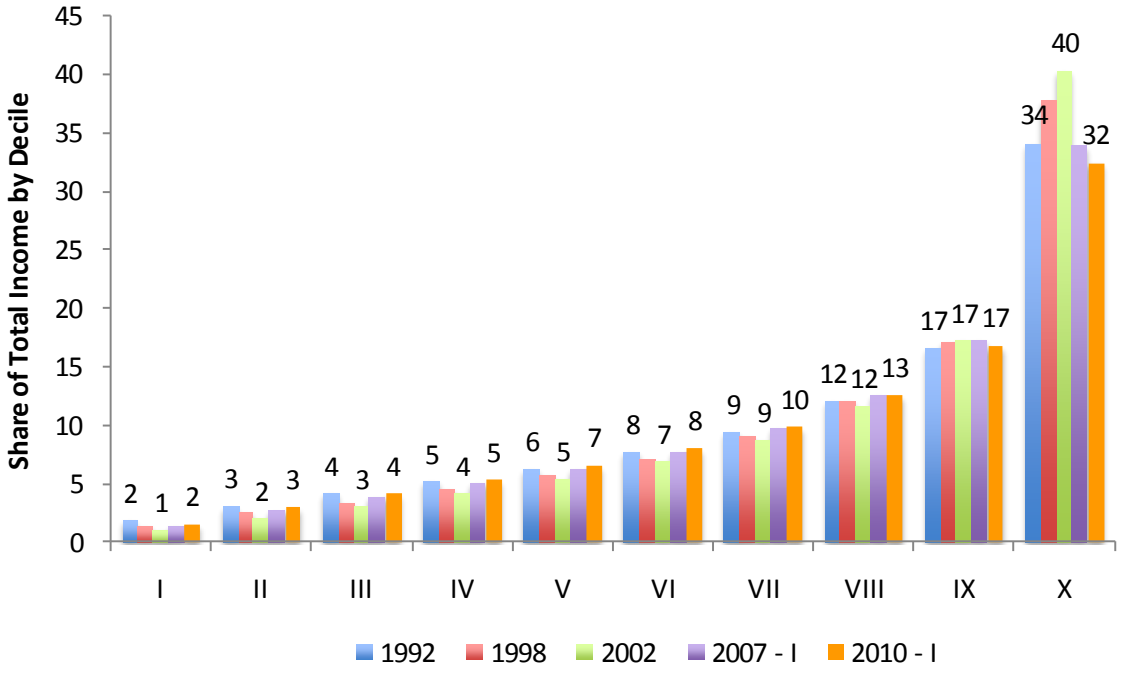
In 1992, average income in the top decile was 19 times that of the lowest decile, the lowest value recorded between 1992 and 2010. In the following years this disparity worsened, with the 10/1 income ratio peaking in 2001. That year, the year of the Argentine crisis and the year preceding the year in which the worst inequality in the distribution of income is recorded, average income in the top decile was 40 times that of the lowest decile. Since the crisis, and especially since

[66] Deciles have 10% of the population, and have an equal number of individuals, not households. (CEDLAS 2010, p.35).

Argentina's economic recovery began in 2003, a decrease in the 10/1 income ratio is observed. By the end of the period, average income in the top decile was back down to 21 times that of the lowest decile.

Finally, Figure 5-3 presents the share of total income by decile for the following years: 1992, 1998, 2007 and 2010.

Figure 5-3. Share of Argentine Household per Capita Income by Decile *



* The 'I' designation for 2007 and 2010 data mean the results correspond to the first quarter of those years.
Source: Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank).

As can be seen in Figure 5-3, the wealthiest segment of the Argentine population commands a very large portion of the national income. The portion appropriated by the top decile increased considerably between 1992 and 2002 (leading up to the crisis): in 2002, the top decile's share was 40 percent, a level higher than in

any other year in Argentine history (or at least, since the data have been available to estimate this measure). However, the top decile's share has declined considerably since 2002, falling to 32 percent in 2010, its lowest share in the period of study.

Compared to the wealthiest decile, the lowest decile has possessed an essentially insignificant share of the national income across the period of study (between 1 and 2 percent). The trend that occurred with the bottom decile is the opposite of that which occurred at the top: its share of total income decreased considerably (by 100 percent) during the 1990s -from 2 to 1 percent- showing that the poorest decile did not benefit from the neo-liberal reforms implemented during the 1990s. The situation has improved for the lowest decile since 2003 (coinciding with the economic recovery in Argentina), returning to a share of 2 percent in 2010, the same as obtained in 1992.

Determinants of Argentine Inequality

Three stages can be identified to evaluate the determinants of the evolution of Argentine income inequality since the mid-1970s. As discussed above, a period of relatively egalitarian distribution of income in the 1950s, 60s, and the early 1970s was broken by structural changes that caused inequality to begin to increase from that time forward. Studies evaluating the causes of this shift generally point to the economic recession that began to set in prior to the arrival of military rule and deepened through the 70s, and, in particular, to the conditions of the labor market. During those years, the dramatic economic recession and associated contraction in the demand for labor negatively impacted remunerations, which brought about deterioration in the income

distribution because the incomes that were most heavily affected were those in the lower income strata. Furthermore, this deterioration was reinforced by changes introduced (by the military regime) in the setting of wages and by less favorable labor negotiations in the context of a reduced minimum wage. These institutional arrangements – among others – noticeably affected the bargaining power of labor unions (Beccaria and Orsatti 1986; Beccaria 1991; Beccaria 1993). Since the beginning of the 1990s, which saw a deepening of the commitment to the deregulation and opening of the economy that was begun in 1976 under the military dictatorship, the number of hypotheses about the causes of increasing inequality has expanded. There is broad agreement in the academic literature that income inequality in Argentina increased from the 1990s until about 2002 (Cruces and Gasparini 2009a; Altimir and Beccaria 2001; The World Bank 2005).

Review of the Argentine literature on inequality reveals a number of hypotheses on the changing inequality in the 1990s, but no consensus around a single factor or set of factors. Some of these hypotheses incline towards explanations that are more microeconomic in nature (e.g. increasing inequality as a function of increasing demand for skilled labor) while others are more macroeconomic in the sense that subjects such as unemployment are recurrent themes.

Among adherents to the microeconomic approach, Gasparini, Marchionni *et al.* (2005) stress that three factors were demonstrably responsible for the increase in income inequality during the 1990s: (1) increasing returns to education, (2) changes in the "endowments" of unobservable factors, and (3) falling hours worked by low income people. Based on these observations, they

rejected the hypothesis that changes in the gender wage gap, the unemployment rate and the educational structure were important factors driving increases in inequality in the 1990s.

Some of these same authors have gone further to investigate the determinants of changes in income distribution. In the Argentine literature, two main "determinants" that would explain the increasing demand for skilled labor are widely explored: (1) trade liberalization - as exemplified by (Cicowiez 2002; Galiani and Sanguinetti 2003; Porto 2006; Galiani and Porto 2010) - and (2) technological change and the incorporation of capital goods (Gasparini 2003; Acosta and Gasparini 2007). Within this school of thought, the consensus that has emerged is that, while both causes would have stimulated an increase in the demand for skilled labor, the latter explanation has greater explanatory power than the former.

Conversely, those authors that have approached the problem from a more macroeconomic perspective point to poor labor market performance,[67] highlighting in particular high unemployment as a fundamental factor (Altimir and Beccaria 1999; Frenkel and González Rozada 2000; Altimir, Beccaria *et al.* 2001; Maurizio 2007). In particular, Altimir and Beccaria (1999) and Altimir, Beccaria *et al.* (2001) conclude that the deterioration in the distribution of income among the economically-active population observed in the first part of the decade (through 1994, to be exact) is explained by increasing unemployment, while further deterioration in the second part of the decade is explained by the combined effects of continued increases in unemployment and a differentiation

[67] For a comprehensive analysis of the worsening of the labor market in Argentina during the 1990s see Bayón 2002.

in wages earned by education level, which they associate with the requirements of a new phase of technological change.

Some of these same authors provide an alternative hypothesis for explaining the apparent skill premium, contradicting the microeconomic arguments (Maurizio 2001; Groisman 2003; Beccaria, Maurizio *et al.* 2006). They posit that Argentine workers may actually have been "over-educated" in this period, hypothesizing that, rather than suffering from an excess demand for skilled labor during the 1990s, Argentina actually had an excess supply of skilled labor that led many individuals to take jobs for which they were overqualified. In this process, they displaced those with lower qualifications, many of whom wound up unemployed, thereby exacerbating economic inequality.

Other authors provide additional insight from the macroeconomic perspective. Marshall (2002, p.227-28) also points to unemployment as a key factor, but extends her argument to point out institutional changes that contributed to the increasing wage differentials in the manufacturing sector during the 1990s. Marshall demonstrated that increasing inequality, specifically in the manufacturing sector, was due not only to unemployment, but also to the effect that unemployment had on labor unions, which significantly undermined their negotiating power. Furthermore, the elimination of inflation, which had previously provided a benchmark to guide negotiation, removed the reference point for collective bargaining, which was replaced with less clearly defined goals associated with the profitability of each industry. For Marshall, the increasing wage inequality in the manufacturing sector was unrelated to changes

in manufacturers' requirements for skilled labor frequently attributed to technological advances resulting from the intensification of international trade.

Finally, the literature on the third stage (from 2003 to the present) is still relatively new, but authors do point out a series of factors that could explain the reduction in inequality during these years. Cruces and Gasparini (2009b, p. 23) summarize these factors nicely:

> …diverse factors combined to generate a scenario of decreasing inequality: (i) recovery from the crisis of 2001-2002, (ii) readjustments associated with the devaluation of the peso, (iii) a strong expansion of employment, (iv) productive changes induced by new relative prices, (v) a slower rate of technological adoption, (vi) stronger institutions and labor policies, and (vii) an expansive fiscal policy, progressive taxation, and a broader social safety network.

With respect to the "unequalizing effect" of increasing returns to education, which was postulated by the authors writing from the microeconomic perspective as a central factor for explaining the increasing wage gap between skilled and unskilled workers during the 1990s, the same authors present empirical evidence for this new stage and conclude that "the effect on inequality of the returns to education was substantial and equalizing during the eighties, high and un-equalizing in the nineties, and of smaller magnitude during the first decade of the 2000s"(Cruces and Gasparini 2009a, p. 412).

Working again with wage data from the manufacturing sector, Marshall (2010) observed decreasing wage differentials in studying the evolution of wages earned in manufacturing between 2003 and 2008. She observed important institutional and economic transformations in this period that caused an important shift in how wages were determined. Institutionally, the State re-

emerged as an important factor in supporting wages at the low end of the wage spectrum - raising the minimum wage and stipulating absolute value wage increases ("suma fija" increases) – and the resumption of centralized collective bargaining of basic salaries empowered the unions. She points to three important economic changes. First, the re-introduction of inflation was also important in homogenizing wage increases. Second, imports slowed due to the high exchange rate, and third, there were changes in the relative demand for different skills: specifically, Marshall points to an increase in the demand for skilled (blue collar) laborers relative to that for (white-collar) professionals. Despite these improvements, she notes that by 2008 the ratio of wages to the value added produced in the manufacturing sector was still lower than it had been in 1997.

PAY INEQUALITY IN ARGENTINA: 1994 - 2007

The following two sections present pay inequality at the sectoral and geographical levels using Theil's T statistic to provide new perspective, with empirical evidence, to the discussion of changes in pay inequality in Argentina in the 1990s and 2000s. The first section presents a calculation of the between-groups component of Theil's T statistic by economic sector, revealing the evolution of inter-sectoral pay inequality as well as the changing contributions of each economic sector through time. Analysis of the between-groups component is completed with a detailed analysis of the changes in relative wages and relative employment in each sector. The second section presents a calculation of overall inter-provincial inequality, composed of inequality between provinces (the between-groups component) and inequality within provinces (the within-

groups component). Finally, the section analyzes in detail the between-provinces component of inter-sectoral inequality, showing the evolution of the contributions of each jurisdiction to "provincial" pay inequality.

In each of these analyses, the period of study is divided into two sub-periods, recognizing the onset of the crisis in December 2001 and subsequent abandonment of the Convertibility Plan as a key inflection point in the evolution of Argentine inequality that also marks the appearance of a new macroeconomic regime in Argentina.[68]

For each analysis, the chapter discusses the significant changes in the presented pay inequality trend and evaluates the significant realignments that have taken place in terms of the relative size and direction of the contributions of key groups (economic sectors or geographic jurisdictions) to the presented trend.

[68] For a detailed description of the Convertibility and post-Convertibility macroeconomic regimes in Argentina see Novick, Tomada *et al.* 2007.

THE EVOLUTION OF INTER-SECTORAL INEQUALITY IN ARGENTINA

Calculation of the between-groups component of Theil's T statistic by economic sector for each year between 1994 and 2007 reveals the evolution of inter-sectoral pay inequality across that period, as well as the contribution of each economic sector to inter-sectoral pay inequality, as shown in Figure 5-4. The calculation is based on data obtained from the administrative registries of the Argentine Integrated Pension System (Sistema Integrado Provisional Argentino, or SIPA, by its Spanish acronym), which provide the level of employment[69] and average pay in the Argentine economy, divided into 22 sectors (21 sector plus an "unclassified" sector, which is not included in the analyses presented in this chapter).

The significant changes in the inter-sectoral trend in inequality and in the contributions of different sectors coincide with the economic and financial crisis of 2001/2002, which led the government to abandon the Convertibility Plan,[70] devaluing the Argentine currency after 10-years of a fixed-exchange regime (among other policy changes), leading to a new macroeconomic construct, the post-Convertibility macroeconomic regime. The shift in inequality that is

[69] Employment figures for Argentina are "jobs declared."

[70] In 1991, the government of Argentina adopted the Convertibility Plan, as well as a package of economic reforms, with the aim of eliminating hyperinflation and finding the path to return to economic growth. This plan pegged the Argentine currency to the U.S. dollar at a fixed rate of 1 peso to 1 U.S. dollar until the beginning of 2002. For a detail assessment of the Convertibility period in Argentina in terms of the macroeconomic performance during the 1990s as well as different aspects of the Convertibility Regime such as the appreciated exchange rate, the dollarization of the financial system, the accentuated dependency on capital flows, the external sustainability and the regime durability see Frenkel (2002).

observed at the sectoral level in Figure 5-4 is also reflected at the provincial level, as discussed in the section entitled "Between-Province Inequality."

Pay Inequality between Economic Sectors

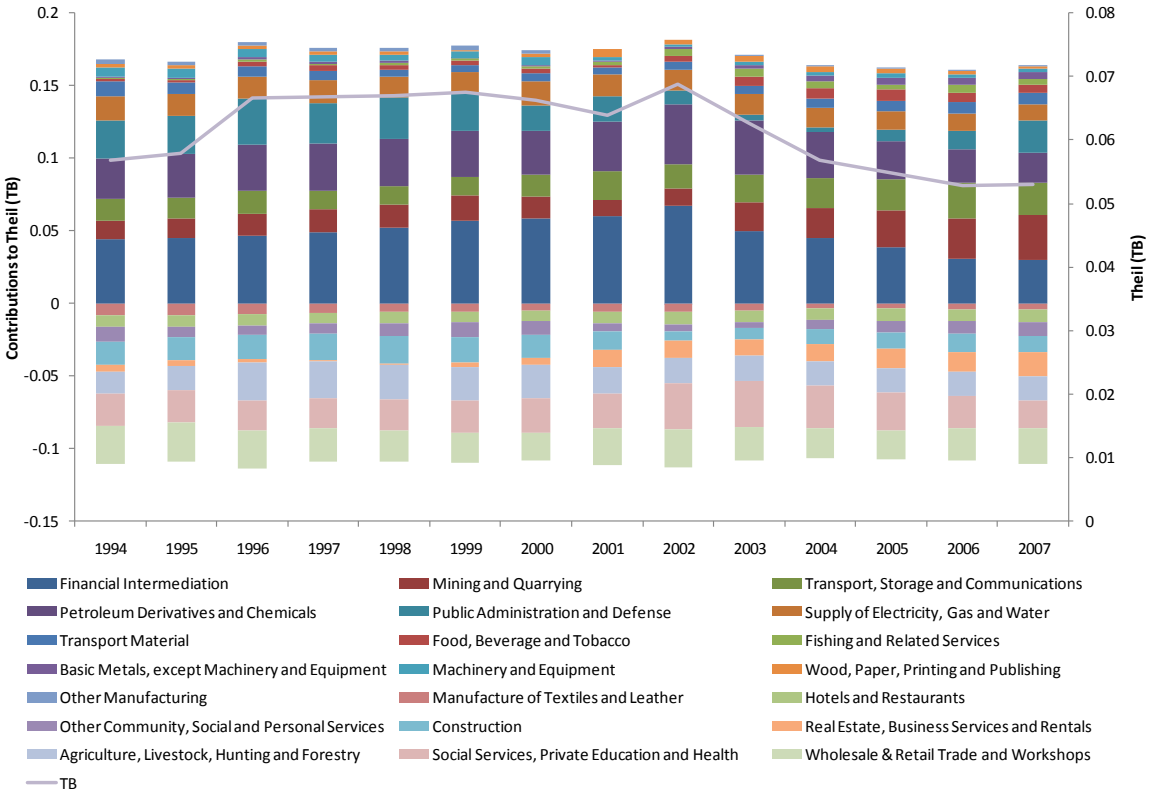
Because of the decomposability of Theil's T statistic, the between-groups component can be estimated by itself as a lower bound on total inequality. Using the between-sector component of Theil's T statistic not only provides insight into the level of inequality between economic sectors, but also captures the contribution of each economic sector to inter-sectoral inequality, achieved by disaggregating the inequality measure into its constituent elements. The contribution of each sector to inter-sectoral pay inequality can be viewed by graphing the individual Theil elements in stacked bar format. Organized in this way, as provided in Figure 5-4, this information can be easily read to determine which sectors gained and lost relative position from one year to the next.

Interpretation of Figure 5-4 revolves around the zero line of the graph. Positive contributors – those sectors making contributions to pay inequality from above – are the sectors in which wages earned were above the national average. These sectors are portrayed above the zero line and are termed "high wage" sectors.[71] Conversely, negative contributors – those sectors making contributions from below – are the sectors with wages below the national average. They appear below the zero line of the graph and may be called the "low wage" sectors.

[71] As explained in the Methods Chapter, this dissertation frequently applies the convention of "contributions from above" and "contributions from below" to discuss the role of high-wage and low-wage groups, respectively. The terms "high wage" and "high pay," as well as "low wage" and "low pay" are used interchangeably to describe economic sectors or geographical jurisdictions in which wages are above or below average.

For both high and low wage sectors, the size of a sector's contribution reflects not only the difference between average wages in that sector and the overall average wage, but also the number of people employed in that sector (e.g. for a sector to make a large contribution to overall inequality, it must have average salaries that are either significantly greater than or less than the national average, and/or it must employ a significant number of people).

Figure 5-4. Pay Inequality by Economic Sector



Source: Author's calculation based on SIPA data.

Figure 5-4 also helps the reader to understand the importance of both the "positive" and "negative" contributions to overall pay inequality. As discussed in the Methods chapter, the high paying sectors contribute positively to Theil's T

statistic and the low-wage sectors contribute negatively, which could be interpreted to mean that inequality increases because of high-wage sectors and decreases due to the low-wage sectors. However, both high and low-wage sectors can cause inequality to either increase or decrease: what matters is the distance from the mean, not the direction. How Theil's T statistic captures this fundamental characteristic of inequality is clearly illustrated by looking at the year 2002 in Figure 5-4, the year in which inequality peaked during the period of study. As can be seen, in 2002 both the sum of the positive contributions and that of the negative contributions are at their greatest absolute levels.

Sectors Contributing to Inequality from Above

There are twelve "high pay" economic sectors – those sectors with average wages above the average wage of the economy – that contribute from above to inter-sectoral pay inequality in Argentina during the period of study: Mining and Quarrying (which includes oil and gas extraction); Financial Intermediation; Public Administration, Defense, and Extraterritorial Organizations and Bodies;[72] Transport, Storage and Communications; Petroleum Derivatives and Chemicals; Supply of Electricity, Gas and Water; Transport Material; Manufacture of Food Products, Beverages and Tobacco Products; Basic Metals, except Machinery and Equipment; Fishing and Related Services; Machinery and Equipment and Wood, Paper, Printing and Publishing. All these sectors contributed to inter-sectoral pay inequality from above; however, given that each sector's contribution depends not only on the wages earned in that sector (relative to the overall average wage) but also on the population share – the number of people employed in that sector

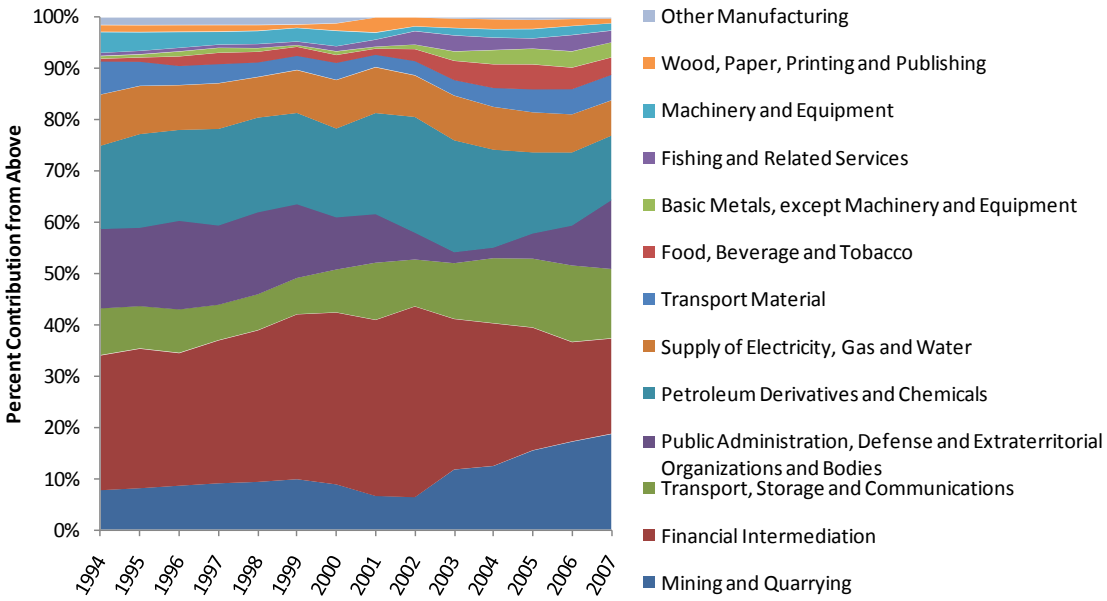
[72] Henceforth referred to as, simply, "public administration."

relative to the total employed population - the relative size of their contributions varied. Of the twelve high-pay sectors, six are responsible for a significant portion of inter-sectoral pay inequality in Argentina between 1994 and 2007: Mining and Quarrying; Financial Intermediation; Public Administration, Transport, Storage and Communications; Petroleum Derivatives and Chemicals; and Supply of Electricity, Gas and Water. Of these six, the financial sector contributed the most to inter-sectoral pay inequality during this period.

To better understand the role of certain sectors in contributing to inequality from above, Figure 5-5 presents the percent of contributions from above by sector between 1994 and 2007, allowing for a more absolute comparison of the roles of individual sectors.

As Figure 5-5 shows, two sectors - Finance and Mining - stand out as being the most significant contributors "from above" to inter-sectoral pay inequality in Argentina between 1994 and 2007.

Figure 5-5. Percent Contribution from Above (1994-2007)



Source: Author's calculation based on SIPA data.

The financial and mining sectors account for 35 to 40 percent of the contributions to inter-sectoral pay inequality from above during this period. Their relative importance is secured despite very low levels of employment in these two sectors: less than 1 percent of the population is employed in the mining sector (between 0.5 and 0.9 across the period), and approximately 3 percent of the employed population works in finance. Instead, the relative importance of these sectors is explained by very high wages: wages in these two sectors are highest in Argentina.[73]

The two sectors follow different trajectories over the 13 years of the study: the contributions of the financial sector increased between 1994 and 2002, after

[73] These two sectors have the highest average wage from the beginning of the period through 2005. Mining retains the top position through the period of study, but in 2005 wages in the financial sector fall to fourth overall.

which -in the post crisis period- the sector's contributions diminished significantly, to the extent that its contributions were surpassed by those of the mining sector in 2007 (as can be seen in Figure 5-5, until that time the financial sector was the single largest contributor from above). In contrast, the contributions of the mining sector were quite consistent (though slightly increasing) between 1994 and 1999, dropped between 1999 and 2002 (as the financial sector's contributions were reaching their peak), and took off after 2002, such that by 2007 the mining sector had become the biggest contributor to inter-sectoral pay inequality from above.

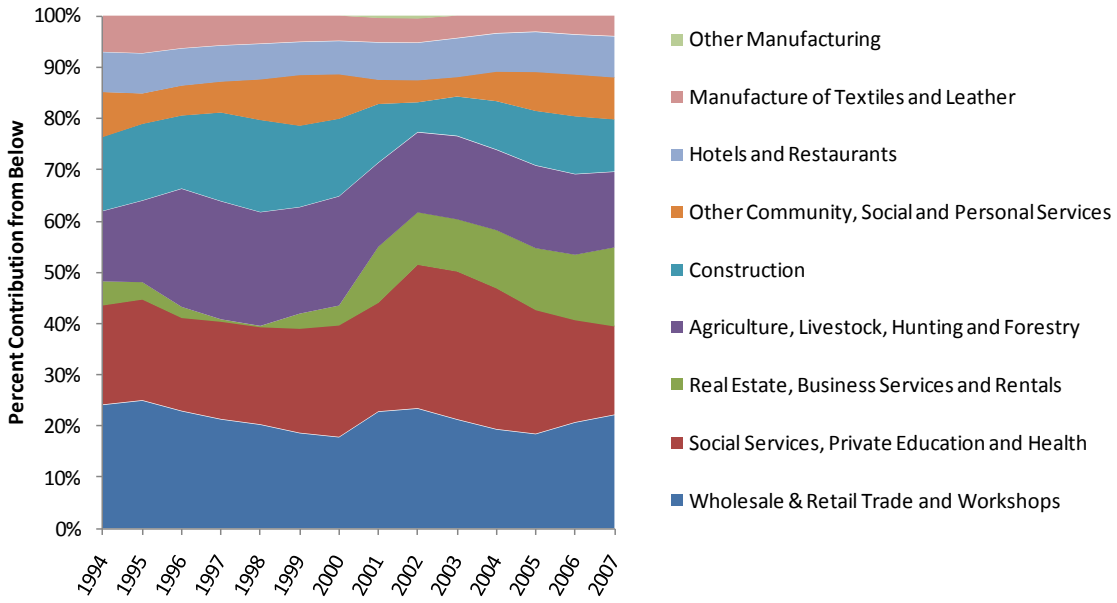
Sectors Contributing to Inequality from Below

Typically, sectors making large contributions to inequality from below are big employers. Those sectors making smaller contributions either employ relatively few people, have average salaries close to the economy-wide average, or both.

The sectors that consistently contributed to inequality from below in Argentina are those low-paying sectors with average wages below the national average, those appearing below the zero line in Figure 5-4: Wholesale and Retail Trade; Social Services, Private Education and Health; Real Estate, Business Services and Rentals; Agriculture, Livestock, Hunting and Forestry; Construction; Other Community, Social and Personal Services; Hotels and Restaurants; Manufacture of Textiles and Leather; and Other Manufacturing. Among these sectors, five were the most significant in terms of their contributions to total pay inequality, accounting for up to 80 percent of contributions from below in the period of study: Wholesale and Retail Trade;

Social Services, Private Education and Health; Real Estate, Business Services and Rentals; Agriculture, Livestock, Hunting and Forestry; and Construction.

Figure 5-6. Percent Contribution from Below (1994-2007)



Source: Author's calculation based on SIPA data.

The Wholesale and Retail Trade sector and the Social Services, Private Education and Health sector make the largest contributions, explaining around 45 percent of the contributions to inter-sectoral pay inequality from below. The large contribution of the Wholesale and Retail Trade sector is due largely to its status as one of the largest employers in the country, with a population share of about 14 percent across the period. The Social Services, Private Education and Health sector is also among the biggest employers in the country, with about 10 percent of total employment.

By the end of the period, the contributions of both sectors had diminished, though their contributions oscillated during the period. The reason for the

reduction in the Wholesale and Retail Trade sector's contribution is clear: its employment share shrank while relative income slightly increased. The reduction in the contributions of the social services sector appears to be primarily an income effect: while its employment share shrank dramatically between 2002 and 2007, employment in this sector was still a greater portion of total employment in 2007 than it had been in 1994.

Two sub-periods of study: significant realignment among economic sectors?

The December 2001 economic crisis and the subsequent devaluation (which occurred one month after the onset of the crisis) mark an inflection point in the trend in inter-sectoral pay inequality. Inequality increased all the way through 2001, peaked in 2002, and decreased from that point on. The decreasing trend that follows the crisis is caused by reductions in the contributions of some sectors - representing losses (in relative wage and/or employment share) in certain high-pay sectors and relative improvement in wages and/or reduced employment in lower pay sectors – that started in 2003 as the Argentine economy began to recover.[74]

The sectors that had contributed the most to inequality "from above" leading up to the crisis saw their relative positions change. In particular, between 2002 and 2007 the contributions of the Mining sector and the Transport, Storage

[74] Inequality will decrease when a high-wage sector experiences a reduction in its share of total employment or in its relative average wage. On the other hand, in the case of a low-wage sector, inequality will decrease when the sector's employment share decreases or when relative average wages in the sector increase. On the contrary, inequality will increase when relative employment and/or relative average wages in a high-wage sector increase. By the same reasoning, low wage sectors can cause inequality to increase by increasing their share of total employment or by lowering wages.

and Communications sector increased, while the relative contributions of three other sectors - Finance, Petroleum Derivatives and Chemicals, and the Supply of Electricity, Gas and Water - all decreased. The net impact of these changes was to reduce inequality.

Of the five most significant sectors contributing to inequality from below, the contributions of the Construction sector and the Real Estate sector increased, the contribution of the Social Services, Private Education and Health sector decreased, and the contributions of the two other sectors - the Agriculture, Livestock, Hunting and Forestry sector and the Wholesale and Retail Trade sector - remained fairly stable. The diminishing contributions of the Social Services, Private Education and Health sector[75] contributed to the overall reduction in inter-sectoral inequality, while the increasing contributions of the Construction and Real Estate sectors worked against the decreasing trend of the second half of the period.

Overall, there was no significant realignment among sectors with high and low salaries between the Convertibility Plan period and the post-crisis period. While changes in the relative contributions to inequality among high-wage sectors and among low-wage sectors did occur – explaining the decreasing trend in inter-sectoral pay inequality since 2002 – the same sectors that were above and below the zero line between 1994 and 2001 remain above and below the zero line between 2002 and 2007.

[75] In the case of social services, both conditions that produce a reduction in contribution to inequality in a low-wage sector - a rise in relative average wages and a reduction in employment share (which happened despite an increase in employment in the sector) – coincided.

What it is clear is that the level of inequality is explained by what happens in a reduced number of sectors, among which, the financial sector and sectors influenced by petroleum-related activities (including both the Mining sector and Petroleum Derivatives and Chemicals) - three sectors with high salaries – played a fundamental role. Changes in the contributions of these sectors alone explain much of not only the growth in inequality under the Convertibility Plan, but also its reduction in the post-crisis period.

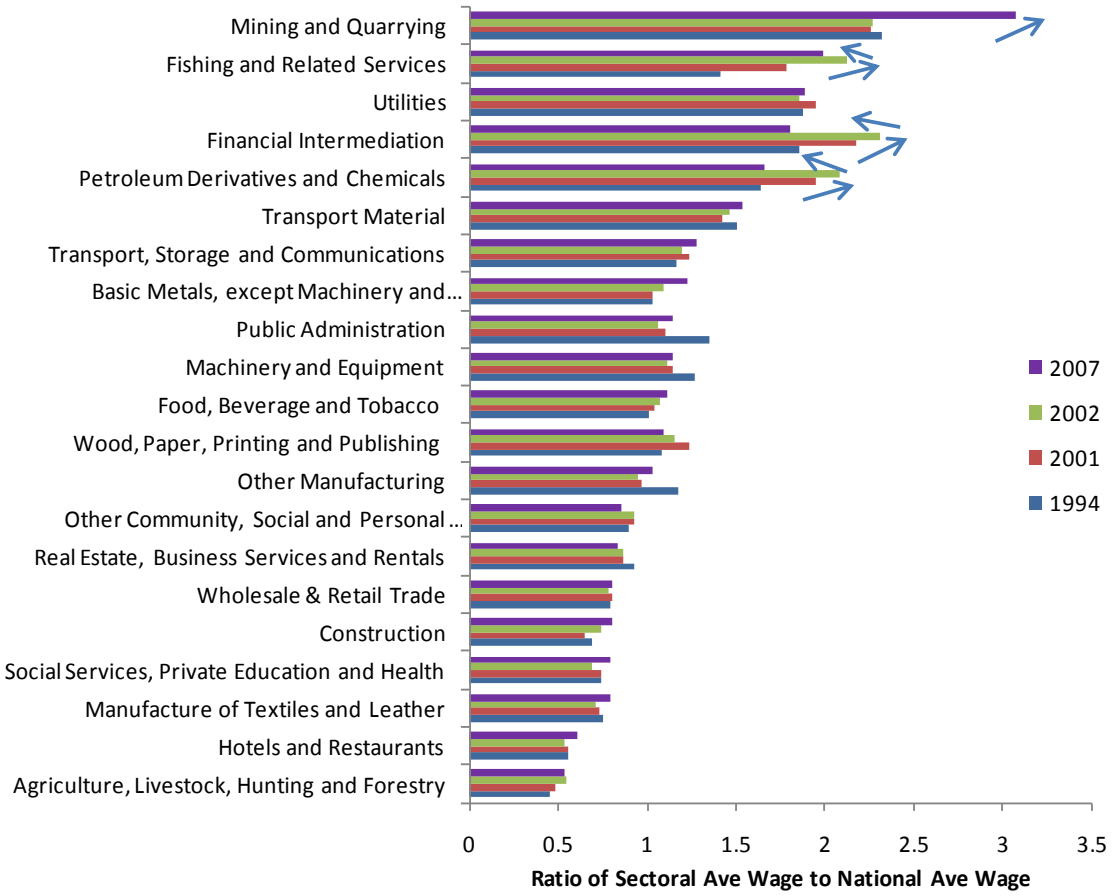
Relative Wages and Employment Levels in 21 Economic Sectors

In this section a detailed analysis of the changes in relative wages and relative employment in each sector is presented, first for the entire period and then for each of the two sub-periods of study.

Relative Wages

Figure 5-7 presents relative average wages (the ratio of a sector's average wage to the average wage in the economy) in each of 21 economic sectors, comparing the different levels of average salaries in each of four different years from the period of study (1994, 2001, 2002, and 2007). The figure provides visual representation of how salaries changed across the period of study, and provides a basis for analysis of the two sub-periods: the first, from 1994 to 2001, and subsequently the post-crisis period from 2002 to 2007.

Figure 5-7. Relative Wages in 21 Economic Sectors



Source: Author's calculation based on SIPA data.

Those sectors with relative average wages greater than one are the same sectors that appear above the zero line in Figure 5-4. Those with relative average wages less than one are low wage sectors and appear below the line in the same figure. Only one sector – Other Manufacturing – moves from between groups in the period of study.

High Wage Sectors

Looking at the entire period of study, the wages of five sectors stand out as the highest relative wages across the period: Mining and Quarrying; Fishing

and Related Services; Supply of Electricity, Gas and Water; Financial Intermediation; and Petroleum Derivatives and Chemicals (ordered according to their relative wages in 2007).[76] With the exception of the Fishing sector, these are the same sectors that are the biggest contributors from above to overall inequality. The fishing sector's contribution is limited by its very small relative size: with less than 1 percent of the total employed population, it is the smallest economic sector considered in this study. Conversely, two sectors that did contribute considerably to overall inequality from above – the public administration sector and the transport, storage and communications sector –do not factor into the top five in terms of relative wage, but, as will be seen below, are large contributors because they have relatively large shares of total employment.

In addition to demonstrating that a small group of sectors consistently provide the highest wages in the economy across the period of study, Figure 5-7 permits an analysis of the changes in relative wages in the six sectors making the largest contributions to inter-sectoral inequality from above during the two sub-periods of the 1994 to 2007 study period. Comparing only relative wages in 1994 to those earned at the end of the period, in 2007, it appears that relative wages in these sectors were generally stable. The relative wage of only two sectors (the Mining sector and the Transport, Storage and Communications sector) increased, and of those increases only that of Mining was sizable, while there was almost no variation in the relative wages in the other three sectors: Financial

[76] If the sectors were sorted by average wage for any year in the period of study prior to 2006, Mining and Finance would be the first two sectors.

Intermediation; Petroleum Derivatives and Chemicals; and the Supply of Electricity, Gas and Water.

However, this picture changes substantially when the period is divided into its two sub-periods. From 1994 to 2001, average wages grew in four of the six sectors (Financial Intermediation; Petroleum Derivatives and Chemicals; Supply of Electricity, Gas and Water; and Transport, Storage and Communications), with significant growth in the Finance and Petroleum Derivatives and Chemicals sectors. During this period relative wages in Mining and Quarrying decreased slightly, while those in Public Administration decreased significantly. While reductions in average wages in these two sectors worked to offset the increases in inter-sectoral inequality provoked by wage growth in the other four sectors, growth in relative wages in the four above-mentioned sectors drove overall pay inequality levels up across this period.

Conversely, in the 2002 to 2007 period, relative wages contracted in the two sectors in which they had grown the most during the Convertibility Plan (Financial Intermediation; and Petroleum Derivatives and Chemicals), while relative average wages grew in the remaining sectors (Mining and Quarrying; Transport, Storage and Communications; Supply of Electricity, Gas and Water; and Public Administration). Average wages in Mining and Quarrying grew significantly – wages in this sector went from twice the national average to three times the national average in these five years, more than 1.5 times the average wage in the next highest-paying sector.

In sum, a clear trend is observed from analyzing the six sectors that contributed the most to overall inequality from above. Whereas under the

Convertibility Plan (1994-2001) average wages grew in 4 of these 6 sectors (Financial Intermediation; Petroleum Derivatives and Chemicals; Transport, Storage and Communications; Supply of Electricity, Gas and Water), and particularly in finance and petroleum (in this order), from 2002 to 2007, following the devaluation of the Argentine currency, the opposite occurred: the sectors in which relative wages decreased were those in which wages had grown the most under the Convertibility Plan (finance and petroleum). The two sectors in which average wages did not grow under the Convertibility Plan - mining and public administration – saw relative wage increases: relative wages in the mining sector grew more than in any other sector during the post-crisis period.

Low Wage Sectors

Figure 5-7 can also be used to observe trends in average wages in the primary sectors contributing to inequality from below. The first observation that can be drawn is that between 1994 and 2007 relative wages in the low-wage sectors did not change significantly: only in a few cases did change occur, and even in those cases the changes are marginal. While the Construction sector seems to have moved up the rankings among low-wage sectors over the period of study, for the most part the sectors with the highest relative wages in 2007 (within this group) are the same sectors for the entire period: Other Community, Social, and Personal Services; Real Estate, Business Services and Rentals; Wholesale and Retail Trade and Workshops; and Social Services, Private Education and Health. Second, while wages in these sectors are the closest of the low-wage sectors to the overall average, many of them are also among the largest contributors to overall inequality from below, implying large employment

shares. The Agriculture sector, also an important contributor to overall inequality from below, is the lowest wage sector in the entire economy across the period of study.

Comparing only the relative wage in each of these sectors at the beginning of the period of study (1994) with those at its end (2007), relative wages contracted only in Real Estate, Business Services and Rentals, while they grew in the four remaining sectors (Wholesale and Retail Trade; Construction; Social Services, Private Education and Health; and Agriculture, Livestock, Hunting and Forestry). Over the entire period, the changes in relative wages are quite small.

However, a different picture emerges when the period is divided in two. In the first sub-period (1994-2001), relative salaries in the sectors that contributed to inequality from below did not register significant changes. There are marginal changes in a few sectors – the Agriculture sector; the Social Services sector; and the Wholesale and Retail Trade sector – in which relative wages increased from 44 percent of the overall average to 48 percent, from 73 to 74 percent, and from 78 to 79 percent, respectively. Conversely, relative salaries in the Construction sector and the Real Estate sector decreased: from 68 percent of the overall average salary to 64 percent and from 91 percent to 86 percent, respectively. Conversely, in the second sub-period (between 2002 and 2007), relative salaries increased in three sectors - Wholesale and Retail Trade; Social Services; and Construction– and decreased in two sectors - Real Estate; and Agriculture.

Analysis of relative wages earned in some critical sectors, and how they changed across the period, provides insight into how these sectors drive the trends in inter-sectoral inequality, both from above and from below. How these

relative wage changes affect inequality between economic sectors is determined by combining these changing wage levels with the corresponding shifts in the number of people employed in these sectors.

Employment Levels

Relative employment levels provide the other determinant of a given sector's contribution to inter-sectoral inequality. Figure 5-8 provides an overview of relative employment levels in each sector. The figure is organized the same way as Figure 5-7, in descending order according to relative employment in the most recent year depicted, 2007.

Figure 5-8. Employment Shares in 21 Economic Sectors

Source: Author's calculation based on SIPA data.

Level of Employment in High Wage Sectors

As in the previous section, this analysis of employment data begins with the sectors that contributed the most to overall inequality across the period of study from above: Mining and Quarrying; Financial Intermediation; Public Administration; Transport, Storage and Communications; Petroleum Derivatives and Chemicals; and Supply of Electricity, Gas and Water.

In general, the sectors making the largest contributions from above to inter-sectoral inequality do not employ a large share of the population. The sum

of employment in four of these sectors - excluding the Public Administration and Transport, Storage, and Communications - does not reach 10 percent of the employed population during the period of study.

Comparing the participation in total employment of each of these 6 sectors at the beginning of the period (1994) with their respective employment shares at the end of the period (2007), reveals that relative employment increased in only two sectors (Mining and Quarrying and Public Administration), while relative employment decreased in the remaining four: Transport, Storage and Communications; Supply of Electricity, Gas and Water; Financial Intermediation; and Petroleum Derivatives and Chemicals.

Looking at the two sub-periods, during the Convertibility Plan (1994-2001) relative employment increased only in the Public Administration sector, and was stable or contracted in the five remaining sectors. The situation was not radically different between 2002 and 2007: the share of total employment in the mining sector continued to increase, but the other five sectors saw their shares of total employment decline.

Level of Employment in Low Wage Sectors

As previously discussed, five sectors make the largest contributions to overall inequality from below: Real Estate, Business Services and Rentals; Wholesale and Retail Trade and Workshops; Construction; Social Services, Private Education and Health; and the Agriculture, Livestock, Hunting and Forestry sector.

Whereas these sectors appeared in the bottom half of Figure 5-7, in Figure 5-8 they appear at, or close to, the top: these sectors employ relatively large

shares of the total employed population. For 2007, employment in these 5 sectors represented almost 50 percent of total employment.

Comparing only the employment shares of each of these five sectors at the beginning of the period (1994) to their respective employment shares at the end of the period (2007), the employment share of the Real Estate sector increased, while those of the four remaining sectors (Wholesale and Retail Trade; Construction; Social Services, Private Education and Health; and Agriculture) remained stable.

For the first sub-period (1994-2001), there was a significant increase in the employment share of the Real Estate sector, consistent with its performance across the period, and a slight increase (about 1 percent) in the shares of two sectors: Social Services, Private Education and Health; and Agriculture. The Wholesale and Retail Trade sector's employment share remained stable, and that of the Construction sector decreased.

Finally, between 2002 and 2007, there is an increase in the employment share of three sectors - Real Estate; Wholesale and Retail Trade; and Construction - and a contraction in those of the Social Services, Private Education and Health sector and the Agriculture sector.

"Boom/Bust" Sectors and Remaining (non-boom) Sectors

The above analyses show how reductions in the contributions to inter-sectoral inequality of certain low wage sectors are part of the overall decreasing trend in inequality post-crisis. However, the analysis of relative average wages in these sectors shows only modest improvement. To the extent low-wage sectors make significant contributions to sectoral inequality, they do so mostly because

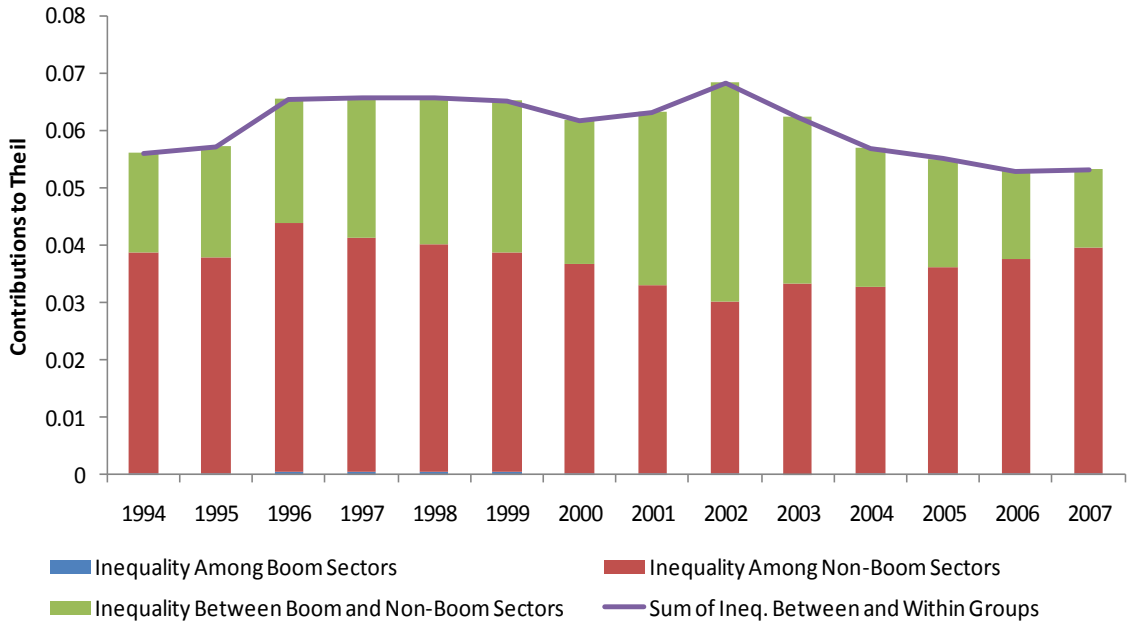
of the large number of people employed in these sectors. Since their wages do not move rapidly, their relative gains in wages are largely attributable to relative reductions in average wages in other sectors, which brings down the national average wage. Conversely, the large changes in the contributions from above to inequality of a few high-pay sectors are due to significant changes in those sectors' wages; they employ relatively few people.

Given this observation, it is instructive to return to the deconstruction of the period of study into two sub-periods and consider the relative change in average wages in the two periods. The three sectors that experienced the biggest increases in their relative average wage during the first period were Fishing, Finance, and Petroleum Derivatives and Chemicals -in that order-. Conversely, the opposite occurred during the post-crisis period: the three sectors that were the hardest hit in terms of the growth of their relative average wage were these same three sectors. As such, these three sectors can be termed Argentina's "Boom/Bust" sectors.

The flexibility of Theil's T statistic allows the performance of an analysis to highlight the critical role of these boom and bust sectors – Finance, Petroleum Derivatives and Chemicals, and Fishing – in driving inequality upwards until 2001, and back downward between 2002 and 2007. For this analysis, the 21 sectors from the between-sector inequality analysis are divided into two groups, with the three Boom/Bust sectors (Finance, Petroleum, and Fishing) in one group, and the remaining 18 sectors in a second group – the non-boom sectors. Within these groups, sector-level data are aggregated for an estimate of inequality between the two groups, but the sector-level data are preserved for a

computation of the inequality within both groups – the inequality among the three boom/bust sectors, and that among the remaining sectors – using the within-groups component of Theil's T statistic.

Figure 5-9. Inequality between and within Boom/Bust and Non-Boom Sectors



Source: Author's calculation based on SIPA data.

The trend in Figure 5-9 mirrors that of Figure 5-4. However, the grouping of sectors highlights the great difference between what was happening in the boom/bust sectors and what was happening in the rest of the economy. In the run-up to the crisis, inequality between the boom/bust and other sectors exploded, from a low of 36 percent of inter-sectoral inequality in 1994, it rose to 56 percent in 2002, an astonishing amount. Over 50 percent of the inequality in the formal economy was between individuals working in three sectors (representing, in that year, 6.5 percent of the formally employed population) and everyone else. After the crisis, as wages in these sectors were drastically reduced,

inequality between them and the rest of the economy fell even more sharply than it had increased in the first period: by the end of the period, inequality between these three sectors and the remaining sectors had fallen to 26 percent. The decrease in inequality between the boom/bust sectors and the remaining sectors of the economy is largely due to the decreasing performance (relative losses in terms of wages and total employment) of the boom/bust sectors.

Interestingly, changes in inequality among the 18 sectors of the rest of the economy trend in the opposite direction of the inequality between the two groups across the period of study – it follows a generally decreasing trend between 1994 and 2001, and an increasing trend from 2002 to 2007. The increase in inequality among the non-boom sectors can be explained by an improvement in the relative performance of some non-boom sectors in the new macroeconomic configuration after the crisis 2001-2002, particularly Mining.

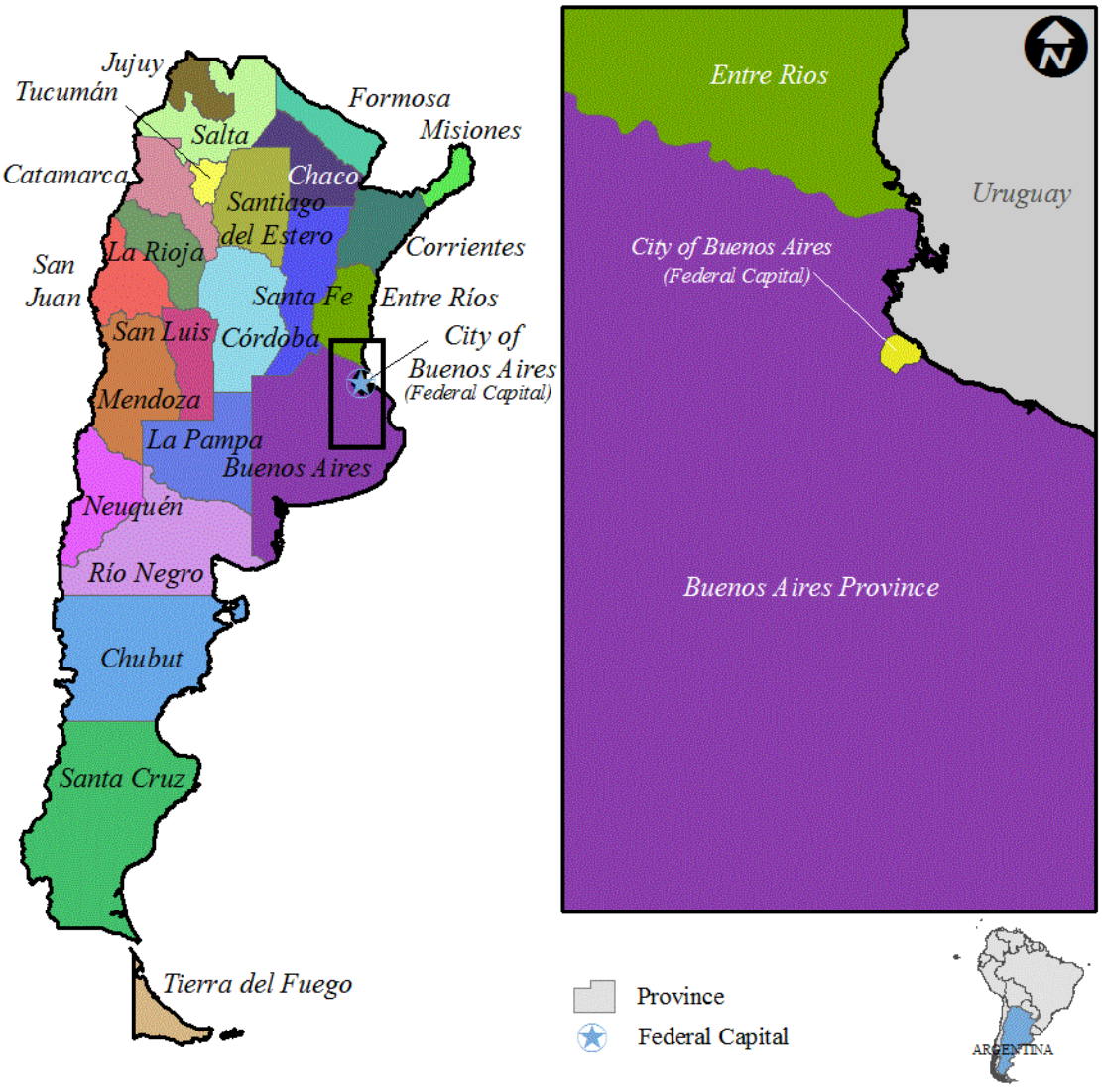
THE EVOLUTION OF GEOGRAPHICAL PAY INEQUALITY IN ARGENTINA

This section analyzes the geographical distribution of Argentine inequality.[77] As shown in Figure 5-10, Argentina is divided into 23 provinces plus Buenos Aires City (Federal Capital).[78] First, overall geographical inequality is presented, as well as the proportions explained by inequality between provinces and the inequality within provinces. Then, the between groups component of Theil's T statistic calculated by province reveals the trend in inter-

[77] For the geographical analysis, relative wages and jobs declared are for the private sector only.
[78] As such, there are 24 jurisdictions used for the analyses presented herein. Although Buenos Aires city is not a province, throughout this section the term 'province' is used to identify these 24 jurisdictions. To avoid any confusion, it is worth mentioning that the city of Buenos Aires is an autonomous district, it is not a part of the province of Buenos Aires, nor is it its capital.

provincial inequality, as well as the contribution of each province to inter-provincial pay inequality.

Figure 5-10. Argentine Geographic Coverage (Provinces)



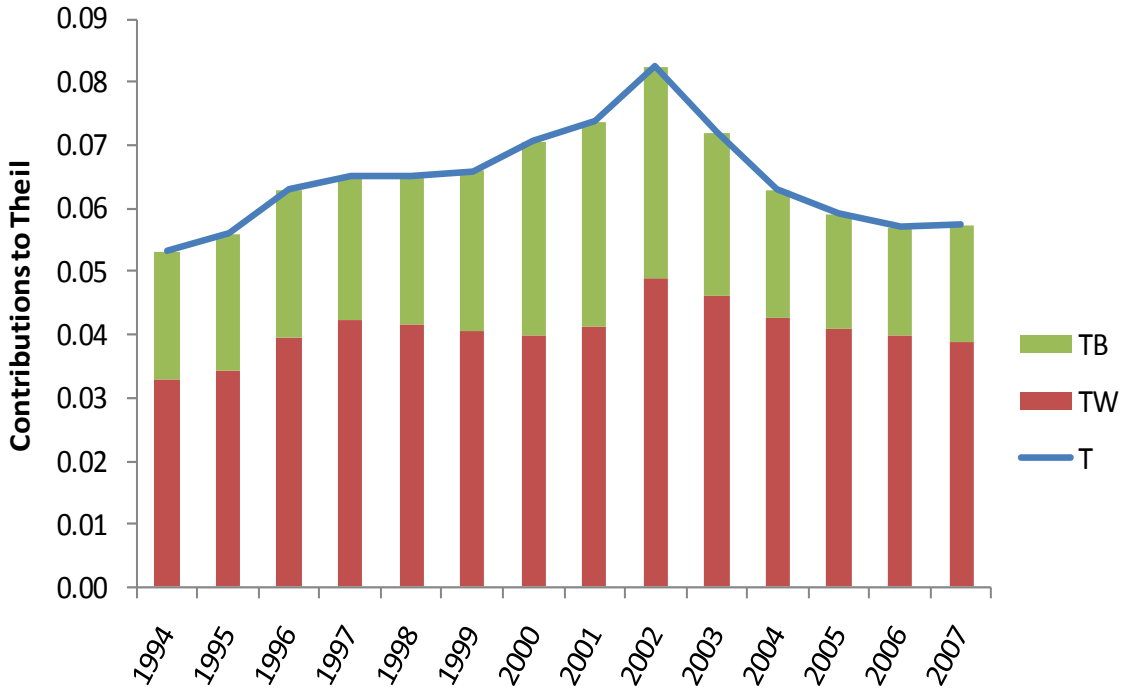
Source: Author.

Inequality between and within the Argentine Provinces

Calculation of the pay inequality between and within the provinces requires average wage and employment data disaggregated by economic sector for each province. The SIPA data available in this form are disaggregated into 9 economic sectors. Because all provinces are partitioned into the same nine sectors, application of Theil's T statistic to these data provides observations that are consistent with one another, thereby facilitating comparison and analysis.

Figure 5-11 shows the overall trend in provincial pay inequality, as well as (thanks to the decomposability property of Theil's T statistic) the proportion explained by inequality between provinces (the between group component) and that due to inequality within provinces (the within group component). Given that the data for each sector within each province are mutually exclusive and collectively exhaustive (MECE), the inequality within each province is estimated by taking the inequality between each province's economic sectors. Total within province inequality is the summation of each province's between- sector inequality weighted by the province's share of the national income.

Figure 5-11. Geographic Inequality in Argentina at the Provincial Level, 1994-2007



Source: Author's calculation based on SIPA data.

The between-province contribution is represented by the area in each column colored in green, while the within province contribution is represented by the area in each column colored in red. Overall inequality - the sum of the between province and within province inequality - is represented by the blue line.

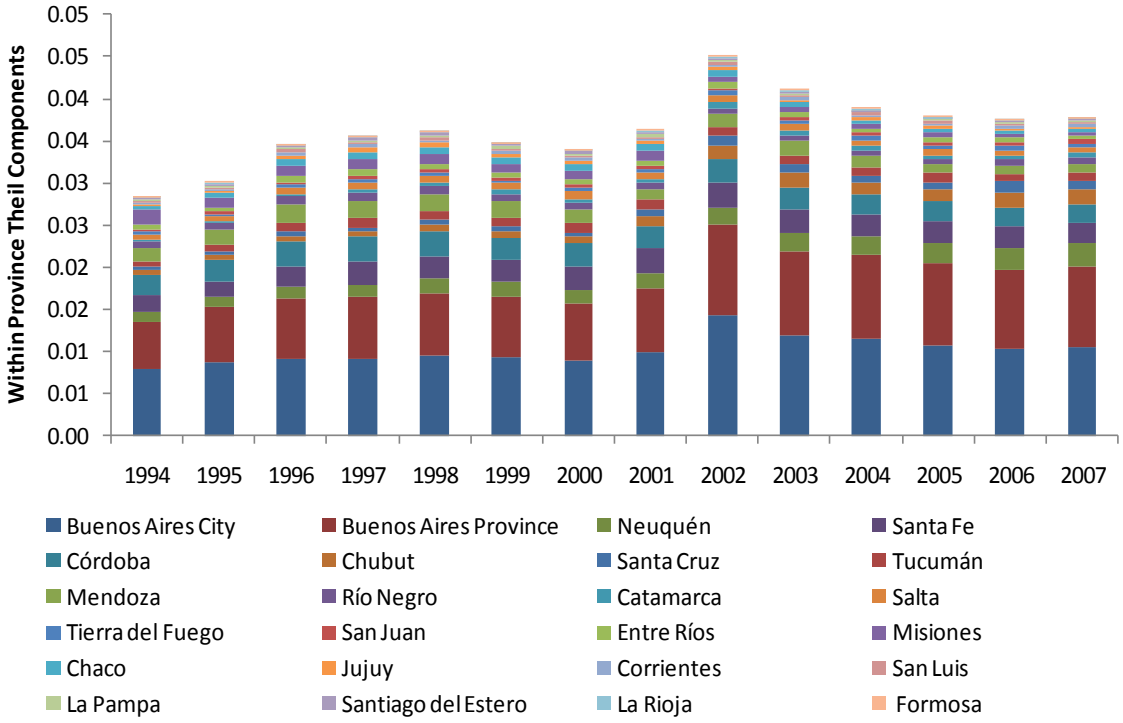
As shown in Figure 5-11, a generally increasing trend (peaking in 2002) can be observed in the years leading up to the economic crisis of 2001-2002, followed by a generally decreasing trend (though overall inequality does not quite reach the levels seen at the beginning of the period). Figure 5-11 also shows that the pay inequality within provinces in Argentina is larger than that between

provinces (an expected result, given that inequality within groups is typically larger than inequality between groups). However, more interestingly, the decrease in overall pay inequality that begins in 2002 is explained to a much greater extent by the decrease in the between-group component than by that of the larger within-group component, particularly in the years between 2002 and 2005, when the decrease in overall inequality was most pronounced. Despite a slight increase in 2007, inequality between provinces decreased by 50 percent more than inequality within provinces from 2002 to 2007.

Within Province Inequality

The inequality within each province is measured as the inequality between that province's economic sectors. The total inequality within the provinces is the sum of each province's between- sector inequality weighted by the province's share of the national income.

Figure 5-12. Income-Weighted Inequality between Sectors within Each Province



Source: Author's calculation based on SIPA data.

Figure 5-12 shows the total contribution of inequality within provinces to overall pay inequality (the red portion of the columns in Figure 5-11) disaggregated into each province's (income-weighted) contribution. Buenos Aires City and Buenos Aires province are the major contributors to inequality within provinces (about half of all the inequality within regions). The remaining 50 percent of inequality within the provinces is distributed among the other 22 Argentine provinces.

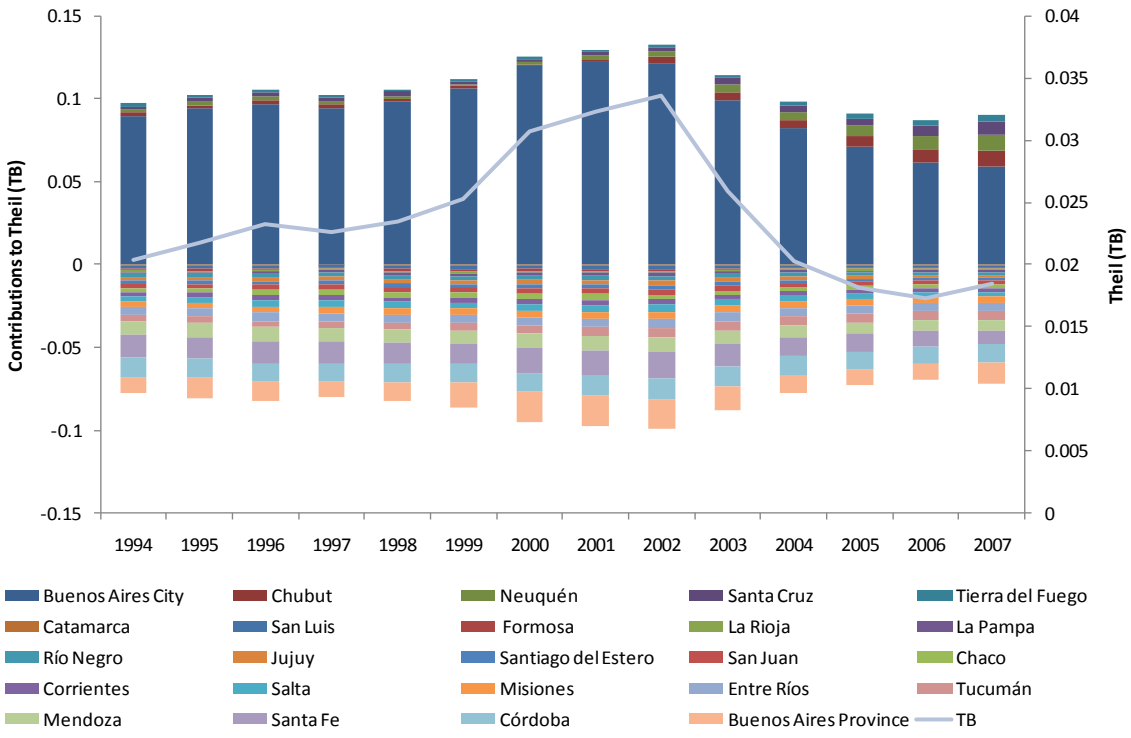
The noticeable jump in within province pay inequality between 2001 and 2002 is driven primarily by increasing contributions from Buenos Aires City (the Federal Capital) and Buenos Aires province. Similarly, the decline from 2002 to

2003 is explained entirely by large decreases in the contributions of Buenos Aires City and Buenos Aires province, as is much of the continuing decrease in within-province inequality until the end of the period.

Between-Province Inequality

The between-group component of Theil's T statistic estimated between provinces provides an overall trend in inter-provincial inequality as well as the contribution of each province to this trend. These calculations are based on employment and average pay data for each of the 23 Argentine provinces and the City of Buenos Aires (the Federal Capital).

Figure 5-13. Pay Inequality between Provinces



Source: Author's calculation based on SIPA data.

Figure 5-13 shows the pay inequality trend by province between 1994 and 2007. Two clear trends emerge during the period of study. The first trend, occurring between 1994 and 2002, is characterized by an upward sloping trajectory (increasing inequality). After peaking in 2002, this pattern reversed: by 2004, inequality between the provinces had fallen to 1994 levels, after which it continues to fall, though more gently, until it levels out in 2006 and ticks upward in 2007.

The dominant component of between-province inequality is the City of Buenos Aires: its increasing contributions until 2002 drive up between-province inequality, and its subsequent falling contributions bring between-province pay inequality back down in the second half of the period. Secondarily, the relative position of some southern provinces, as measured by their contributions to pay inequality, began to increase in 2002: Chubut, Tierra del Fuego, Santa Cruz and Neuquén all began to make larger contributions to inequality under the post-convertibility macroeconomic regime. Taken together, these four provinces and the City of Buenos Aires are the jurisdictions that contributed to pay inequality in Argentina from above during the period under study. Unsurprisingly, these five high pay jurisdictions also have the highest levels of GDP per capita in Argentina (Lo Tartaro 2006). Of these five geographical jurisdictions, the City of Buenos Aires made far and away the largest contribution to pay inequality from above across the period of study.

The provinces that contributed from below to inter-provincial inequality are those provinces with average wages below the national average (those appearing below the zero line in Figure 5-13): Buenos Aires Province, Córdoba,

Santa Fe, Mendoza, Tucumán, Entre Ríos, Misiones, Salta, Corrientes, Chaco, San Juan, Santiago del Estero, Jujuy, Río Negro, La Pampa, La Rioja, Formosa, San Luis and Catamarca (ranked from largest contributor to smallest according to the last year of the series, 2007). The provinces making the largest contributions from below were Buenos Aires Province, Córdoba, Santa Fe and Mendoza. Broadly, the (negative) contributions of these provinces increased as inequality was increasing (through 2002), and decreased in the second half of the period, from 2002 to 2007 along with inter-provincial inequality.

The Economies of the High Pay Provinces

With the exception of the City of Buenos Aires, what distinguishes the high pay provinces (Neuquén, Chubut, Santa Cruz and Tierra del Fuego) is that oil and gas extraction plays an important role in their economies. These provinces (again excluding Buenos Aires City) are sparsely populated: with 550,000 inhabitants, Neuquén has the largest population, while Tierra del Fuego is the least populated, with just 126,000 inhabitants (see Table B-2, Appendix B, population by province 2001-2010). The concentration of significant oil and gas activity in a region with limited other economic activity (due to its small population) helps explain why these provinces have the highest gross domestic product (GDP) per capita after Buenos Aires City.

On the other hand, the important contribution of Buenos Aires City is explained because it is the financial, commercial, industrial, political, and cultural center of Argentina. It employs about 30 percent of the total formally-employed population across the period of study, according to SIPA data. The city's economy is unique in that a large share of its Gross Geographic Product

(GGP)[79] is produced in the services sector, within which the financial and real estate sectors play a fundamental role.

The Economies of the Low Pay Provinces

The distinguishing characteristic of the provinces that contributed the most to inequality from below (Buenos Aires Province, Córdoba, Santa Fe and Mendoza) is that they are major centers of salaried formal employment in the country, accounting for 51 percent of the formally employed population in Argentina: in 2007 Buenos Aires Province provides 31 percent of salaried formal jobs, Cordoba provides 8 percent, Santa Fe another 8 percent, and Mendoza provides 3 percent.[80] These provinces are characterized by diverse economies with important primary and secondary sectors.[81] They are also the countries' major exporters: in 2007, Buenos Aires (37.2 percent), Santa Fe (22.5 percent), and Córdoba (12 percent) were responsible for 72 percent of all Argentine exports. This 72 percent of total exports includes 58 percent of all primary goods, 88 percent of manufactures of agricultural origin (MAO), 79 percent of manufactures of industrial origin (MIO), and 51 percent of all fuels (see Table B-1, Appendix B, for the composition of Argentine exports by province in 2007).

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[79] Gross Geographic Product (GGP) is the same as GDP, except that it applies to geographic units (provinces in this particular case) that are not entire countries.

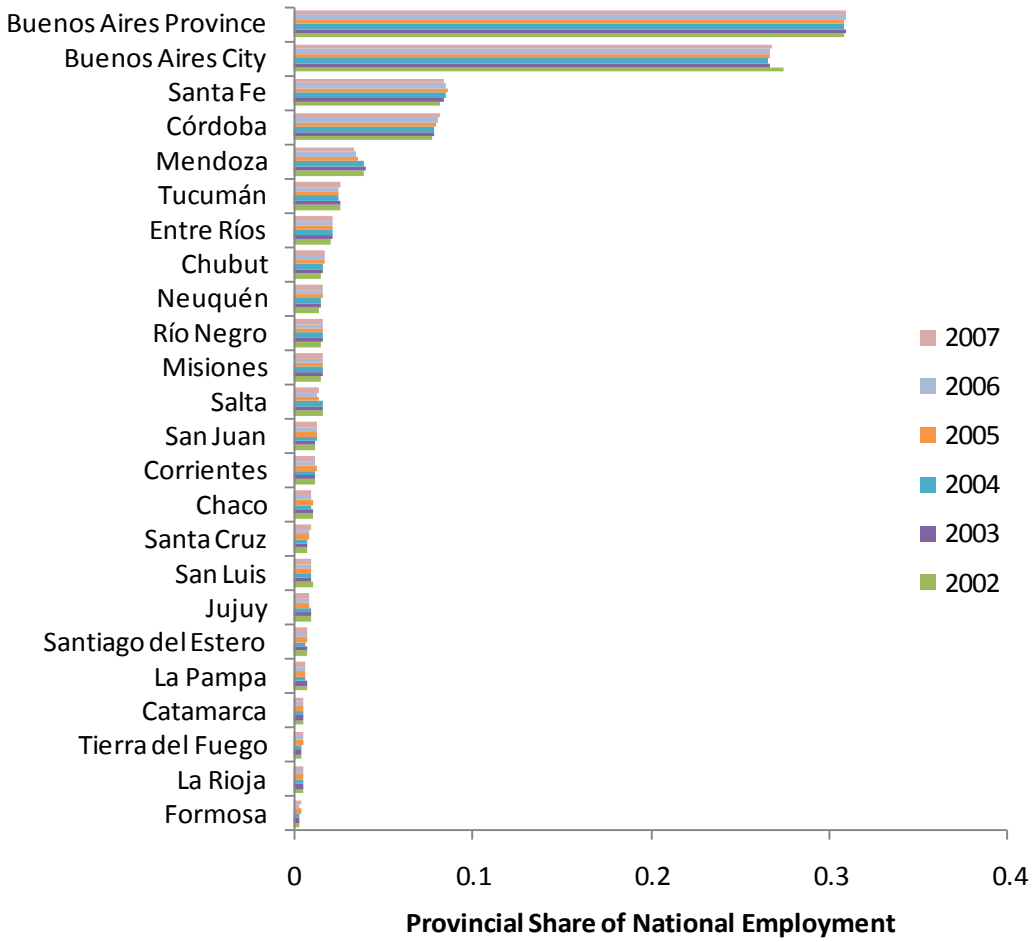
[80] Add Buenos Aires City, with 27 percent of the formally employed population, and about 80 percent of all formal, salaried employment in the country is provided in just 5 geographical jurisdictions.

[81]For example, the manufacturing sector represented 26.7 percent of the GPP of Buenos Aires Province between 1993 and 2002, whereas between 2003 and 2006 its share grew to 32.8 percent (Narodowski and Panigo 2010, p.34).

Realignment among Geographical Jurisdictions under the Post-Convertibility Macroeconomic Regime

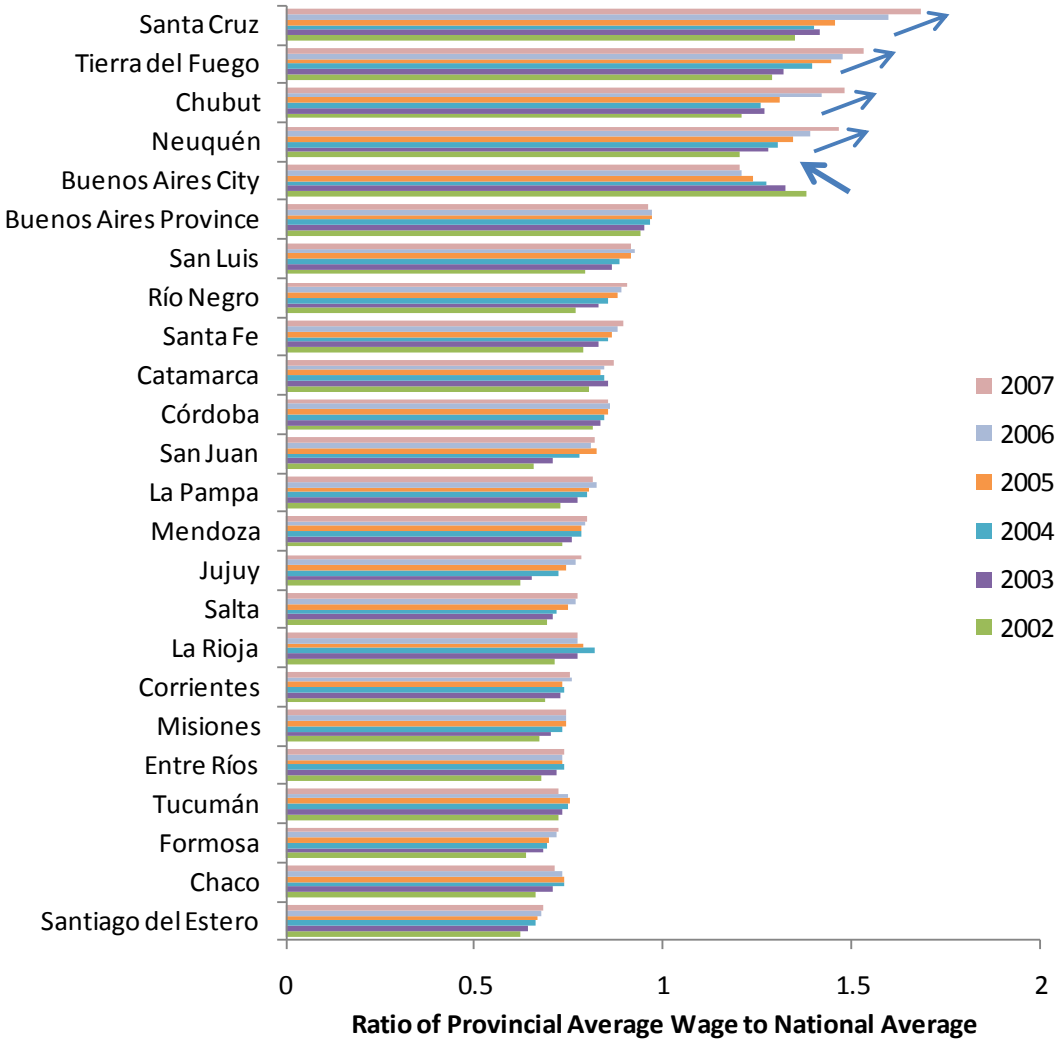
Analysis of relative wages and employment levels for the sub-period from 2002 to 2007 provides insight into the changing contributions of key geographical jurisdictions driving the observed reduction in inter-provincial inequality under the post-Convertibility macroeconomic regime. As Figure 5-14 shows, employment shares are quite stable following the crisis. With respect to relative wages (Figure 5-15) two observations stand out for the post-Convertibility period. First, relative wages in the City of Buenos Aires fell considerably, and second, relative wages improved in a lot of provinces; however, the largest improvement in relative wages occurred in the Patagonian provinces of Santa Cruz, Tierra del Fuego, Chubut, and Neuquén (see map in Figure B-1 of Appendix B).

Figure 5-14. Shares of Employment by Province, 2002 – 2007



Source: Author's calculation based on SIPA data.

Figure 5-15. Relative Average Wages by Province, 2002 – 2007



Source: Author's calculation based on SIPA data.

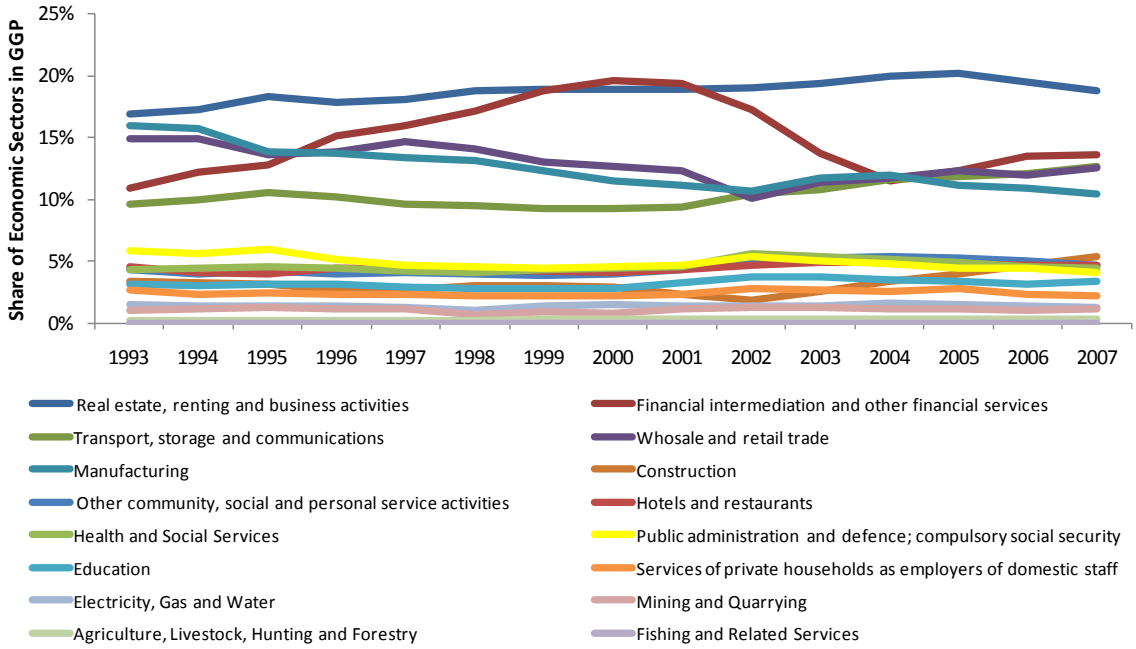
Figure 5-15 shows the extent to which relative incomes readjusted in the post-Convertibility period. The decreasing relative average wage of Buenos Aires City stands out as almost the only strong negative trend: the improved relative wages of most of the other provinces came at the expense of Buenos Aires City.

The largest relative gains are in the high wage Patagonian provinces[82] (Santa Cruz, Tierra del Fuego, Chubut and Neuquén), but many of the below-average wage provinces also gained. Underlying these relative wage trends, average wages increased for all provinces (including the City of Buenos Aires) from 2002 to 2007; however, the improvements in average wages were not uniform. Jujuy and San Juan were the provinces experiencing the largest growth (in percentage terms) in average wages, followed by the Patagonian provinces. The average wage in the City of Buenos Aires increased by 92 percent in this time, but this was the slowest rate of wage growth of any jurisdiction.

Relative wage gains in the provinces came almost entirely at the expense of relative wages in Buenos Aires City. As can be seen in Figure 5-16, decreasing relative wages in Buenos Aires City can be attributed in no small part to a gross decline in the importance of the financial sector in the wake of the crisis.

[82] According to the groupings used by the National Institute of Statistics and Census (Instituto Nacional de Estadística y Censos, or INDEC), the Patagonian Region is composed by the following provinces: Chubut, Neuquén, Río Negro, Santa Cruz and Tierra del Fuego. Therefore, almost all of the Patagonian provinces (all except Río Negro) are high pay provinces (see map in Figure B-1 of Appendix B).

Figure 5-16. Shares of the City of Buenos Aires's GGP Derived from Each Sector



Source: General Direction of Statistics and Census, Ministry of Public Finance, Government of the City of Buenos Aires.

In 1993, the Financial Intermediation sector produced less than 11 percent of the Gross Geographic Product (GGP) of Buenos Aires City. By 2000 and 2001, leading up to the crisis, it had arrived at 20 percent: in those eight years, its real contribution to the city's GGP more than doubled, growing by 125 percent. Given the significant concentration of the financial sector in Buenos Aires City, this confirms what was observed at the sectoral level: the relative position of the financial sector grew during the 1990s and diminished in the post-crisis period.

At the same time that the new macroeconomic configuration after the crisis diminished the importance of the financial sector and, with it, the contributions of the City of Buenos Aires to geographical inequality, favorable conditions emerged for regional economies across the rest of the country: a more

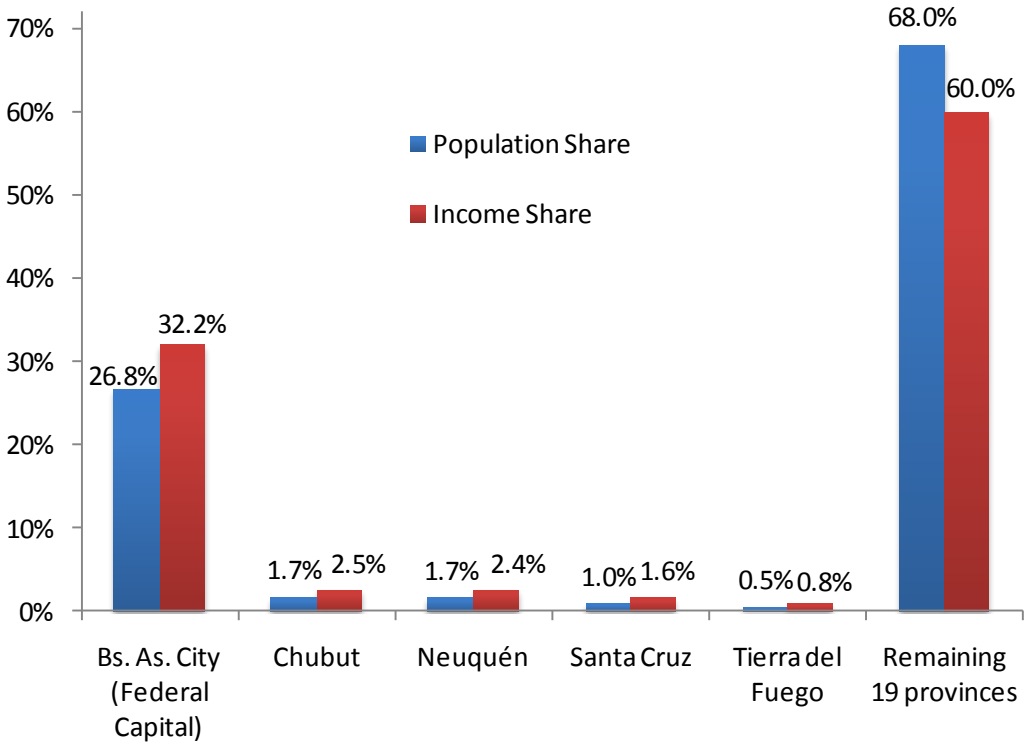
favorable exchange rate for exports and increasing commodity prices in international markets, accompanied by increasing world demand. As such, the relative positions of both high and low pay provinces have improved in the post-convertibility macroeconomic regime. The high pay provinces of Neuquén, Chubut, Santa Cruz and Tierra del Fuego have benefited tremendously from increases in petroleum prices, while low wage provinces have benefitted more from surges in the demand for primary goods (particularly soybeans) and their derivatives (e.g. soy oil and soy flour). Additionally, growth in manufactures of industrial origin also played a significant role in the Argentine recovery. The economic recovery changed the shape of both employment and wages in the provinces: broadly, both grew across the entire country. However, this growth was not uniformly distributed, and what matters for estimating inequality with Theil's T statistic are the provinces' population (employment) and income shares. As can be seen in Figures 5-14 and 5-15, employment growth did not drastically change the employment shares of the provinces, whereas relative incomes grew (almost entirely at the expense of Buenos Aires City); as such, decreasing inequality in the post-crisis period is largely an income effect.

High Pay Jurisdictions: the City of Buenos Aires and the Patagonian Provinces

As mentioned above, the provinces contributing from above to inter-provincial pay inequality in Argentina are the City of Buenos Aires and four provinces of the Patagonian region: Chubut, Neuquén, Santa Cruz and Tierra del Fuego (largest to smallest according to the last year of the series, 2007). As Figure 5-17 shows, Buenos Aires City and the four other high-pay jurisdictions account

for about 32 percent of the country's formally employed population but take in 40 percent of total wage income.[83]

Figure 5-17. Population and Income Shares of High Pay Provinces, 2007



Source: Author's calculation based on SIPA data.

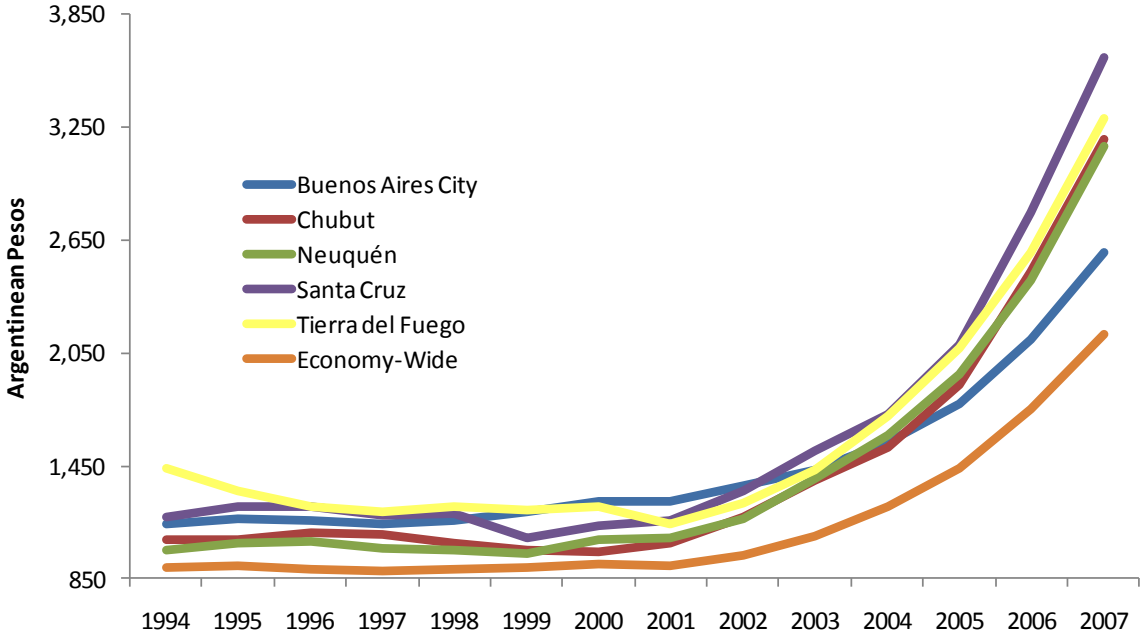
There is a clear difference between the kinds of contributions made by these different geographical jurisdictions. Whereas Buenos Aires City provides above average wages to a significant portion of the population employed (around 30 percent across the period of study), the Patagonian provinces provide significantly above-average wages to a small group of people (from Tierra del Fuego's 0.5 percent of the employed population to 1.7 percent in Neuquén, with

[83] If Buenos Aires province is included, 63 percent of the formally employed population and 70 of total income are represented by just 6 of Argentina's 24 geographical jurisdictions.

the two other provinces in between). The small employed populations explain why, despite increases since 2002, the size of these provinces' contributions from above remains small.

Figure 5-18 shows how growth in average wages in the Patagonian provinces outpace the growth in average wages in the overall economy, and of wages in Buenos Aires City, particularly when wages began taking off after 2001 and 2002.[84] This explains, at least in part, these provinces' increasing contributions (as seen in Figure 5-13) since 2002 as well as Buenos Aires City's decreasing contributions in the same time period.

Figure 5-18. Average Wages by Province



Source: Author's calculation based on SIPA data.

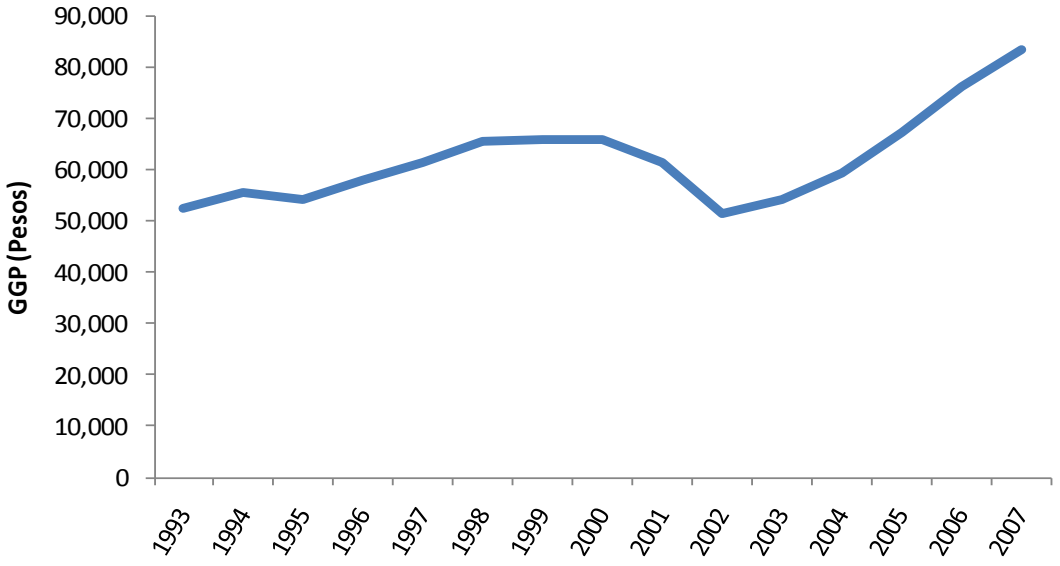
[84] The difference between the four Patagonian provinces and the rest of the economy that is observed in Figure 18 would be even more pronounced if the 'economy-wide' group did not include these same provinces.

The Patagonian provinces have the highest salaries in the country: by 2005, all average wages in all four provinces had surpassed even those of Buenos Aires City, relegating the city to fifth in the country in terms of average wage. In 2007, the highest provincial average salary – that of Santa Cruz ($3,621) - was followed by those of Tierra del Fuego ($3,296), Chubut ($3,190) and Neuquén ($3,152). The City of Buenos Aires followed these four with an average wage of $2,587, while in the rest of the provinces the average wage ranges from $2,060 (Buenos Aires Province) down to $1,473 (Santiago del Estero).

Buenos Aires City

The differences in the economies of Buenos Aires City and the Patagonian provinces are further revealed by examining their exports and the sectoral composition of their GGPs.

Figure 5-19. Gross Geographical Product at Producers' Prices, Buenos Aires City



Source: General Direction of Statistics and Census, Ministry of Public Finance, Government of the City of Buenos Aires.

As shown in Figure 5-19, the growth in Buenos Aires City's GGP that occurred between 1993 and 1999 was lost during the crisis: in 2002 the city's GGP fell back to 1993 levels. It was not until 2005 that Buenos Aires City's GGP bounced back to the pre-crisis levels of 1999-2000, and it has continued to grow since then. Despite these fluctuations in internal GGP, Buenos Aires's share of national GDP has consistently been around 25 percent.[85]

The relatively slow recovery of Buenos Aires City's economy as compared to that of the rest of the country is largely explained by the nature of the recovery, which was built on increased economic activity among goods-producing sectors and the services associated with these sectors. Devaluation of the Argentine Peso at the beginning of 2002 created favorable conditions for growth in these goods-producing sectors: the shift in relative prices provoked by the devaluation favored tradable goods over non-tradable ones, such as services. Given the concentration of activity in the services sectors in the City of Buenos Aires, this shift was not favorable to the city:

> The elevated role of services in the generation of its GGP, particularly that of the financial sector, is what determined that between the crisis of 2001 and 2003 the City grew at lower rates than the observed average level of growth for the country, as opposed to what occurred in the 1990s, when for many years the GGP of the city grew at rates much higher than the rest of the country (Dirección General de Estadística y Censos 2006, p.1, author's translation).

[85] The City of Buenos Aires's share of national gross value added rose to 26 percent in 2007. In the years from 1993 to 1998 and again from 2002 to 2004 the City's share was between 23 and 23.5 percent of the total. From 1999 to 2001 its share was between 24.5 and 25 percent, and in 2006 and 2007 it reached 26 percent (Dirección General de Estadística y Censos 2008, p.3, author's translation).

As shown in Table 5-1, the economy of the City of Buenos Aires is split about 80/20 in the production of services and goods, whereas economy-wide in Argentina this split is about 65/35. Two service sectors predominate in the GGP of the city: in 2007, Real Estate, Renting and Business Activities explained 18.1 percent of the GGP of Buenos Aires City, followed by financial intermediation, which was responsible for 13.8 percent of the city's GGP.

Table 5-1. Sectoral Composition of the GGP of Buenos Aires City and the Argentine GDP at Basic Prices in Constant (1993) Pesos, Presented as Percentages of the Totals.[86a]

	1993		2001		2007	
	GGP Bs. As. City	GDP Nation	GGP Bs. As. City	GDP Nation	GGP Bs. As. City	GDP Nation
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
A. Agriculture, Livestock, Hunting and Forestry	0.2	5.3	0.3	5.8	0.3	5.7
B. Fishing and Related Services	0.0	0.2	0.0	0.2	0.0	0.1
C. Mining and Quarrying [b]	1.0	1.6	1.1	2.0	1.1	1.5
D. Manufacturing	16.0	19.5	11.8	16.2	13.6	17.7
E. Electricity, Gas and Water	1.5	2.1	1.4	3.0	1.3	2.8
F. Construction	3.4	6.1	2.3	5.0	5.1	6.8
G. Wholesale and retail trade	15.0	15.3	12.3	13.4	12.4	13.7
H. Hotels and restaurants	4.6	2.5	4.3	2.7	4.5	2.6
I. Services of Transport, storage and communications	9.7	7.3	9.4	8.9	12.1	11.3
J. Financial intermediation and other financial services	11.0	4.2	19.3	6.3	13.8	5.1
K. Real estate, renting and business activities	17.0	15.4	18.8	15.7	18.1	13.6
L. Public administration, defense (?) and compulsory social security	5.9	6.6	4.7	5.6	4.1	4.8
(M + N) Education, Health and Social Services	7.5	8.2	7.7	9.0	7.0	8.0
(O + P) Other community, social and personal services and Services of private households as employers of domestic staff	7.1	5.8	6.5	6.2	6.8	6.1

a. Sectors classified according to the National Classification of Economic Activities (ClaNAE, 1997).

b. Mining and Quarrying contributions to the GGP of Buenos Aires City correspond to the central administrative services of the mining companies.

Source: General Direction of Statistics and Census, Ministry of Public Finance, Government of the City of Buenos Aires.

[86] Table extracted from Dirección General de Estadística y Censos (2008, p. 7-8).

A number of observations can be drawn from Table 5-1. First, the economy of the City of Buenos Aires is based primarily on the provision of services. Second, there is a pronounced fall in the share of the manufacturing sector, in both Buenos Aires and the country, during the 1990s leading up to 2001, the year of the crisis. Unsurprisingly, with the abandonment of the Convertibility Plan and the associated devaluation, not only did exports increment, but the entire industrial sector of the Argentine economy was strengthened. There was a clear trade-off between a strong manufacturing sector and a strong financial sector in the period of study, given the opposing trends in these two sectors: whereas manufacturing was falling until the crisis and recovered only afterwards, the financial sector's importance grew significantly between 1993 and 2001 (particularly in Buenos Aires City, where its share of GGP grew from 11 percent to 19 percent) and tumbled with the crisis. Table 5-1 also provides a clear picture of the exaggerated role of the financial sector in Buenos Aires City as compared with the rest of the country: while the financial sector varies between 11 and 20 percent of the GGP of Buenos Aires City, it is never more than 6 percent of the overall economy.

Export data provide additional insight into the structural differences between the economy of Buenos Aires City and that of the rest of the country, allowing additional insight into economic outcomes associated with the different policies implemented in the period of study. The fact that Buenos Aires City's economy is principally service-based explains why it contributes only 1 percent of national exports, despite the city's outsized role in the overall economy (see Table B-1 of Appendix B). Whereas the city's economy is predominately based on

services and commercial activities, that of the rest of the country focuses on the production of primary goods and of fuels and energy. What manufacturing activity does exist in the City is focused on internal markets (Observatorio de Comercio Internacional de Buenos Aires 2010, p. 8).

Patagonian Provinces[87]

The production of goods is a much more significant part of the economies of the Patagonian provinces than it is for the City of Buenos Aires, which is explained in good measure by the significant role that the Mining and Quarrying sector plays in these provinces due to the presence of oil and gas production. Decomposing the GGP of the Patagonian provinces (whether in constant or current prices) reveals that the Mining and Quarrying sector is the single largest contributor to GGP.

Together, the Patagonian provinces accounted for six percent of all Argentine exports in 2007 (Neuquén provided 1 percent, Chubut 3 percent, Santa Cruz 1 percent, and Tierra del Fuego also provided 1 percent. see Table B-1, Appendix B). The majority of these exports are from the oil and gas sector: these four provinces are responsible for 26 percent of Argentina's fuel exports. The share of exports by sector within these provinces further highlights the importance of oil and gas extraction in the economies of these provinces: it is responsible for between 33 and 84 percent of these provinces' exports, as shown in Table 5-2.

[87] Excluding the Province of Río Negro.

Table 5-2. Economic Activity of the Patagonian Provinces

	Amount (Thousands of US Dollars)	Share (%)
Chubut	**1,652,066**	**100%**
Oil and Gas	648,001	39%
Aluminum	463,710	28%
Fishing	316,750	19%
Wool and Leather	174,632	11%
Others	48,973	3%
Neuquén	**685,237**	**100%**
Oil and Gas	577,546	84%
Orchards	74,784	11%
Others	32,907	5%
Santa Cruz	**798,032**	**100%**
Oil and Gas	309,149	39%
Fishing	240,161	30%
Gold	171,165	21%
Others	77,557	10%
Tierra del Fuego	**456,132**	**100%**
Oil and Gas	149,881	33%
Petrochemicals	136,853	30%
Fishing	84,433	19%
Automotive	61,245	13%
Others	23,720	5%

Source: INDEC.

PRELIMINARY CONCLUSIONS

This chapter has provided an analysis of pay inequality in Argentina between 1994 and 2007. The period of study is divided by a defining event in recent Argentine economic history – the crisis of 2001/02 - providing two clear sub-periods for analysis: the Convertibility era macroeconomic regime, and the

post-Convertibility regime. The most important difference between the macroeconomic regimes of the first period (1994-2001) and the post-crisis period (2002-2007) was the exchange rates the government promoted, which had important implications for wages. While in the 1990's the model was based on maintaining exchange parity between the Argentine peso and the dollar – as governed by the Convertibility Plan – with its consequent overvaluation of the peso, monetary policy in the post-crisis period has contributed to a sustained undervaluation of the peso. This distinction is central because both exchange rate parity and consistent undervaluation of the national currency as policy instruments reflect distinct choices in how Argentina articulates its relation with the world economy: in terms of the prices of exportable products, those of imported components and capital goods, and the country's ability to manage the productive process, the labor force, and its costs in the face of economic cycles and growth. As shown in this chapter, the impacts of these policies are reflected in the dissimilar performance of the economic sectors during these two sub-periods and, consequently, in the level of pay inequality. It is not mere coincidence that inequality increased until 2002 and has been decreasing since then.

The transition between the two macroeconomic regimes also marked the inflection point in Argentine pay inequality trends during the period of study, regardless of how inequality was measured. The trends in inter-sectoral inequality, overall geographic inequality, and both components of geographic inequality (between provinces and within provinces) all increase until 2002 and diminish thereafter, from 2002 to 2007.

Sectoral Inequality

Decomposition of Theil's T statistic demonstrated that there were a limited number of sectors in which major changes in contributions to inequality affected overall Argentine inequality in the period of study. The financial sector, contributing from above, is the sector most responsible for increases in inequality leading up to the crisis, and reductions in inequality post-crisis. Despite conceding the top spot in 2007, the financial sector was the single largest contributor to overall inequality for almost the entirety of the period of study, from 1994 to 2006, overtaken by the mining and quarrying sector only in 2007. Of other sectors contributing from above, two additional sectors exhibited similar patterns to that of Finance (increasing and decreasing contributions pre- and post-convertibility): Petroleum Derivatives and Chemicals, and Supply of Electricity, Gas, and Water. For this reason, these three sectors can be thought of as the Boom/Bust sectors of the period of study. As demonstrated in the analysis comparing these sectors to the rest of the economy, more than half of the inequality in Argentina's formal economy in 2002 was between these three sectors (accounting for only 6.5 percent of formal employment) and the remaining sectors of the economy.

With the declining contributions of the Boom/Bust sectors in the second half of the period, a number of sectors' contributions from above grew, with two sectors in particular making significant advances: Mining (primarily extraction of oil and gas) and Transport, Storage, and Communications. Compression of the wage structure associated with the overall decline in inequality also means contributions from below diminished. Modest improvements in relative wages in

many of the low-wage sectors were offset (in terms of contributions to inequality) by increases in the sectors' shares of employment.

Geographic Inequality

The overall trend in geographic inequality (composed of inequality between and within the provinces) is similar to, though more pronounced than, the trend in inequality between sectors: inequality increases in the years leading up to the crisis, and falls post-crisis. Component analysis of the contributions of each province to within-province inequality reveals that changes in the inequality within the City of Buenos Aires drive changes in within-province inequality: over 80 percent of the large drop in 2003 is a reduction in the inequality within Buenos Aires City, attributable, in no small part, to the fall of the financial sector associated with the crisis.

The City of Buenos Aires (Federal Capital) also dominates contributions to inequality between provinces in the period of study, and is the key component driving both the pre-crisis increase and the post-crisis decrease. The evolution of inequality between the provinces and the City of Buenos Aires is a reflection of the observation from the sectoral analysis of the important role of the financial sector in both the increase and subsequent decrease in inequality in Argentina. Increasing contributions from the Patagonian provinces (excluding Río Negro) in the post-crisis period are also a reflection of observations from the sectoral analysis: increasing oil and gas activity in these provinces is responsible for an increase in high-wage jobs, causing both relative wages and employment to increase in those provinces. In other words, the rising fortunes of the Patagonian provinces were due to both population and income effects (both the population

shares and the income shares of these provinces increased between 2002 and the end of the period). Conversely, Buenos Aires City saw both its population and income shares decline (from 32 percent in 1994 to 27 percent in 2007 and from 40 percent in 1994 to 32 percent in 2007, respectively).

While changes in the contributions of the provinces with below average wages may have made a smaller impact on inter-provincial inequality than Buenos Aires City, shifts in the economies of the four provinces making the largest contributions from below - Buenos Aires province, Santa Fe, Córdoba, and Mendoza - are clearly an important part of the emergence of the Argentine economy from the crisis of 2001/02, primarily due to the commodities boom and the broadly improved conditions for Argentine industry. The four largest contributors from below all had employment shares that were quite stable in the post-crisis period, but participated in the improvement in relative average wages that took place in this time. As a result, their contributions to interprovincial inequality decreased.

References

Acosta, Pablo and Leonardo Gasparini. 2007. "Capital Accumulation, Trade Liberalization, and Rising Wage Inequality: The Case of Argentina." *Economic Development & Cultural Change* 55(4):793-812.

Altimir, Oscar. 1986. "Estimaciones de la Distribución del Ingreso en la Argentina, 1953-1980." *Desarrollo Económico* 25(100):521-566.

Altimir, Oscar and Luis Beccaria. 1999. "Distribución del Ingreso en la Argentina." Serie Reformas Económicas No. 40, Comisión Económica para América Latina y el Caribe (CEPAL), Santiago, Chile.

—. 2001. "El persistente deterioro de la distribucion del ingreso en la Argentina." *Desarrollo Económico* 40(160):589-618.

Altimir, Oscar, Luis Beccaria, and Martín González Rozada. 2001. "La evolución de la distribución del ingreso familiar en argentina: Un análisis de sus determinantes." Serie de Estudios en Finanzas Públicas, Universidad Nacional de La Plata, Buenos Aires, Argentina.

Bayón, María Cristina. 2002. "Coping with job insecurity: The experience of unemployment in contemporary Argentina." Dissertation, The University of Texas at Austin, Austin.

Beccaria, Luis. 1991. "Distribución del Ingreso en la Argentina: Explorando lo sucedido desde mediados de los setenta." *Desarrollo Económico* 31(123):319-338.

—. 1993. "Estancamiento y Distribucion del Ingreso." in *Desigualdad y Exclusión: Desafíos para la Política Social en la Argentina de fin de siglo*, edited by A. Minujin. Buenos Aires: UNICEF: Losada.

Beccaria, Luis, Roxana Maurizio, Fernando Groisman, and Mariana Laura González. 2006. "La Sobreeducación en la Provincia de Buenos Aires: Un análisis Exploratorio." Instituto de Ciencias. Universidad Nacional de General Sarmiento, Buenos Aires, Argentina.

Beccaria, Luis and Alvaro Orsatti. 1986. "La Distribución Personal del Ingreso en el Gran Buenos Aires en el período 1974-1983." CEPAL Working Paper No. 23, Comisión Económica para América Latina y el Caribe, Buenos Aires, Argentina.

CEDLAS. 2010. "Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank): Methodological Guide." Center for Distributional, Labor and Social Studies, Buenos Aires, Argentina.

Cicowiez, Martín. 2002. "Comercio y Desigualdad Salarial en Argentina: Un Enfoque de Equilibrio General Computado." Departamento de Economía, Facultad de Ciencias Económicas, Universidad Nacional de La Plata, Buenos Aires, Argentina.

Cruces, Guillermo and Leonardo Gasparini. 2009a. "Desigualdad en Argentina. Una revision de la evidencia empirica." *Desarrollo Económico* 48(192):395-437.

—. 2009b. "Desigualdad en Argentina. Una revisión de la evidencia empírica (II) " *Desarrollo Económico* 49(193):3-29.

Diéguez, Héctor L. and Alberto Petrecolla. 1974. "La distribución funcional del ingreso y el sistema previsional en la Argentina, 1950-1972." *Desarrollo Económico* 14(55):423-440.

Dirección General de Estadística y Censos. 2006. "Producto Bruto Geográfico de la Ciudad de Buenos Aires." Informe de Resultados No. 245, Ministerio de Hacienda, Gobierno de la Ciudad de Buenos Aires, Argentina.

—. 2008. "Producto Bruto Geográfico de la Ciudad de Buenos Aires." Report No. 373, Ministerio de Hacienda, Gobierno de la Ciudad de Buenos Aires, Argentina.

Frenkel, Roberto. 2002. "Argentina: A Decade of the Convertibility Regime." R*evista de Economia Política* 22(4):3-14.

Frenkel, Roberto and Martin González Rozada. 2000. "Balance-of-Payments Liberalization: Effects on Growth, Employment and Income in Argentina." CEPA Working Paper No. 14, Schwartz Center for Economic Policy Analysis, New School University.

Galbraith, James K., Laura Spagnolo, and Sergio Pinto. 2007. "Economic Inequality and Political Power: A Comparative Analysis of Argentina and Brazil." B*usiness and Politics* 9(1).

Galiani, Sebastian and Guido Porto. 2010. "Trends in Tariff Reforms and in the Structure of Wages." R*eview of Economics and Statistics* 92(3):482–494.

Galiani, Sebastian and Pablo Sanguinetti. 2003. "The impact of trade liberalization on wage inequality: evidence from Argentina." J*ournal of Development Economics* 72:497– 513.

Gasparini, Leonardo. 2003. "Argentina's Distributional Failure: The role of Integration and Public Policies." CEDLAS Working Paper No.1, Centro de Estudios Distributivos, Laborales y Sociales, Universidad Nacional de la Plata, Buenos Aires, Argentina.

Groisman, Fernando. 2003. "Devaluación educativa y segmentación en el mercado de trabajo del área metropolitana de Buenos Aires entre 1974 y 2000." E*studios del trabajo* 25:73–97.

—. 2008. "Efectos distributivos durante la fase expansiva de Argentina (2002-2007)." R*evista de la CEPAL* (96):201-220.

INDEC. 2003. "La nueva Encuesta Permanente de Hogares de Argentina." Instituto Nacional de Estadística y Censos (INDEC), Buenos Aires, Argentina.

Lo Tartaro, Diego. 2006. "El déficit consolidado de las provincias rondará los $11.500 millones este año." Instituto Argentino para el Desarrollo de las Economías Regionales (IADER), Buenos Aires, Argentina.

Marshall, Adriana. 2002. "Transformaciones en el empleo y la intervencion sindical en la industria: efectos sobre la desigualdad de salarios." D*esarrollo Económico* 42(166):211-230.

—. 2010. "Desigualdad salarial en la industria argentina: Discusión de las tendencias en 2003-2008." Documentos para Discusión No. 5, Instituto de Desarrollo Económico y Social (IDES), Buenos Aires, Argentina.

Maurizio, Roxana 2001. "Demanda de trabajo, sobreeducación y distribución del ingreso." 5 Congreso Nacional de Estudios del Trabajo, Buenos Aires, Argentina.

Monza, Alfredo. 1973. "La medición empírica de la distribución funcional del ingreso." D*esarrollo Económico* 13(50):315-332.

Narodowski, Patricio and Demian Panigo. 2010. "El nuevo modelo de desarrollo nacional y su impacto en la Provincia de Buenos Aires." Cuadernos de Economía No.75, Ministerio de Economía de la Provincia de Buenos Aires, La Plata, Buenos Aires.

Novick, Marta, Carlos Tomada, Mario Damill, Roberto Frenkel, and Roxana Maurizio. 2007. "In the wake of the crisis: Argentina's new economic and labour policy directions and their impact." Research Series 114, International Institute for Labour Studies of the International Labour Organization, Geneva, Switzerland.

Observatorio de Comercio Internacional de Buenos Aires. 2010. "Exportaciones de la Ciudad de Buenos Aires en el primer semestre de 2010." Report No. 8, Ciudad Autónoma de Buenos Aires, Argentina.

Orsatti, Alvaro. 1983. "La nueva distribución funcional del ingreso en la Argentina " D*esarrollo Económico* 23(91):315-337.

Porto, Guido. 2006. "Using survey data to assess the distributional effects of trade policy." J*ournal of International Economics* 70(1):140-160.

The World Bank. 2005. "Argentina - A la busqueda de un crecimiento sostenido con equidad social: observaciones sobre el crecimiento, la desigualdad y la pobreza." Report No. 32553-AR, The World Bank, Washington, D.C.

Chapter 6: Brazil

This chapter begins with an overview of the evolution of income inequality in Brazil during the period of study, after which it presents two sections on the use of Theil's T statistic to identify trends in pay inequality. The first section focuses on the inequality between economic sectors, and the following section discusses trends in geographical inequality at three levels: between regions, states, and municipalities. Finally, preliminary conclusions are presented.

EVOLUTION OF INCOME INEQUALITY IN BRAZIL AND ITS DETERMINANTS

Brazil remains one of the most unequal countries in the world despite the fact that the steady decline in its inequality in the last decade has helped to lower Brazil's world inequality rank. According to Barros, De Carvalho *et al.* (2010a, p.7), "However, even after this accentuated decline in the degree of inequality, the concentration of Brazilian income still is extremely high, with around 90 percent of countries still presenting income distributions less concentrated than that of Brazil" (author's translation). In the same paper, the author's note that in 2007, "the income appropriated by the poorest 50 percent is slightly higher than the income appropriated by the richest 1 percent of the Brazilian population (Barros, De Carvalho *et al.* 2010a, p.8).[88]

In the Latin American region (a region with high levels of inequality),[89] Brazil's income distribution has also remained one of the worst. It is difficult to

[88] The distribution analyzed is individual income, based on total household income per capita.

[89] Income inequality is a pervasive issue in Latin American countries (LAC); their economies have been characterized as some of the most unequal, if not the most unequal, in the world. As Gasparini, Cruces *et al.* (2008, p.12) notes, "LAC countries are located among the most unequal

give a definite ranking in terms of inequality among Latin American countries due not only to the intrinsic problems with household surveys, but also because of the methodological difficulties when it comes to comparing inequality indicators obtained from different countries' household surveys in the region. Székely and Hilgert (1999), after studying these issues using household surveys for 18 Latin American and the Caribbean (LAC) countries conclude:

> Surprisingly, our analysis shows that the impression obtained about the ranking of countries in terms of inequality, and that our ideas about the effect of inequality on other development indicators, can be a mere illusion caused by differences in the characteristics of household surveys, and by the way in which the data is treated (Székely and Hilgert 1999, p.6).

However, despite some minor differences and changes in the rankings depending on methods and interpretations, Bolivia, Haiti, Brazil and Colombia are among the most unequal countries in the region (Gasparini, Cruces *et al.* 2008, p.5).

By the end of the nineties, the shared understanding among all those involved in the study of inequality in Brazil was that apart from its high levels of income inequality, Brazil's income inequality had remained roughly constant during the 1980s and 1990s (Barros, Henriques *et al.* 2001). According to Barros, Henriques *et al.* (2001, p.16), the level of inequality observed in Brazil in 1999 was similar to that registered at the end of the seventies. Based on the authors' calculations, the gini coefficient of household per capita income went from 0.62

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economies both in terms of consumption and income." However, the author notes that inequality levels are as high if not higher in some Asian economies than the most unequal economies of Latin America and, on a regional level, there is some evidence that other regions, including Africa, may be even more unequal.

in 1977 to 0.60 in 1999.[90] Across the period of study (1977-1999), inequality levels remained surprisingly stable, except for an increase at the end of the 1980s. Between 1986 and 1989 an accelerated increase in inequality occurred, reaching extreme levels (the gini coefficient rose to 0.64) in 1989, at the height of that period's macroeconomic instability.

In a study of the evolution of Brazil's urban income distribution between 1976 and 1996, Ferreira and Barros (1999) took their analysis a step further to investigate how inequality in Brazil remained essentially constant during these two decades in the context of an adverse macroeconomic environment and in which the Brazilian economy underwent significant structural changes, particularly changes in demographics (increases in both the population and the rate of urbanization and a decrease in fertility rates), economic structure (in particular, a growth in services accompanied by a decline in agriculture), and educational attainment (an increase in the average years of schooling). What is striking about this period is that extreme poverty increased despite growth in mean incomes and a stable or slightly declining level of inequality.

Ferreira and Barros (1999),[91] using a micro-simulation-based decomposition methodology, found the main factors behind the increase in extreme urban poverty to be income losses at the very bottom of the income distribution due to changes in the occupational structure of the population (an increase in unemployment and a shift from formal employment to participation

[90] The distribution utilized was that of households, using total household income per capita.

[91] One year after this article was published in The Brazilian Review of Econometrics in 1999, a summarized version was published in CEPAL's Review in 2000 (Ferreira and Barros 2000). In 2005, it was included as a chapter of a co-edited book by Bourguignon, Ferreira, and Lustig as one of the World Bank's publications (Bourguignon, Ferreira *et al.* 2005).

in the informal economy) and declines in the average returns to both schooling and experience. However, two opposing phenomena contributed to higher levels of income per capita, counterbalancing these negative effects: an increase in the average effective years of schooling, and a reduction in family size. Unfortunately, the very poor households that make up the bottom of the urban Brazilian income distribution did not benefit from these counterbalancing trends.

The recent academic literature agrees that a shift is taking place in Brazil: extensive evidence suggests a significant reduction in income inequality in Brazil around the 2000s. Gasparini, Cruces *et al.* (2008, p.5) notes for Brazil that "while its income distribution did not change much in the first half of the 1990s, inequality has fallen substantially since 1999. The gini coefficient was 60.4 in 1990, 58.6 in 1999, and fell to 55.9 in 2006."

Similarly, according to Barros, De Carvalho *et al.* inequality in per capita household income has experienced a continuous and impressive fall since 2001. The authors show that the gini coefficient was around 0.60 in 1996, 1997 and 1998, decreased to 0.59 in 1999, maintained relatively stable levels between 1999 and 2001, and began to fall in earnest beginning in 2001, down to 0.55 in 2007, its lowest level in the last 30 years (2010a, p.10). [92]

This decline in inequality is not exclusively a Brazilian phenomenon: other authors, like López-Calva and Lustig (2010) have documented that income inequality has fallen in the 2000s in Latin America, signaling a turning point from the increases of the previous two decades (1980s and 1990s). What is

[92] These estimates are based on the Brazilian National Household Survey (Pesquisa Nacional por Amostra de Domicílios, or PNAD). Here, income refers to monetary income before deductions of taxes and social security: it does not include any kind of capital gains.

impressive about the Brazilian case is the speed of the reduction. According to Barros, De Carvalho *et al.* "…achieved in six years (2001 – 2007), the 7 percent fall in the gini coefficient can be considered one of the fastest (declines) in the world." (Barros, De Carvalho *et al.* 2010a, p.13). In a different study but with the same authors, (Barros, De Carvalho *et al.* 2010b, p.38) they estimated the contributions of some factors to the decline in inequality during this period (2001-2007) and concluded that "the recent decline in inequality resulted from three main factors: (1) an increase in contributory and non-contributory government transfers, (2) a decline in wage differentials by educational level and reductions in the inequality in education caused by an accelerated expansion of labor force educational level, and (3) an improvement in spatial and sectoral integration of labor markets, in particular among metropolitan and non-metropolitan areas."

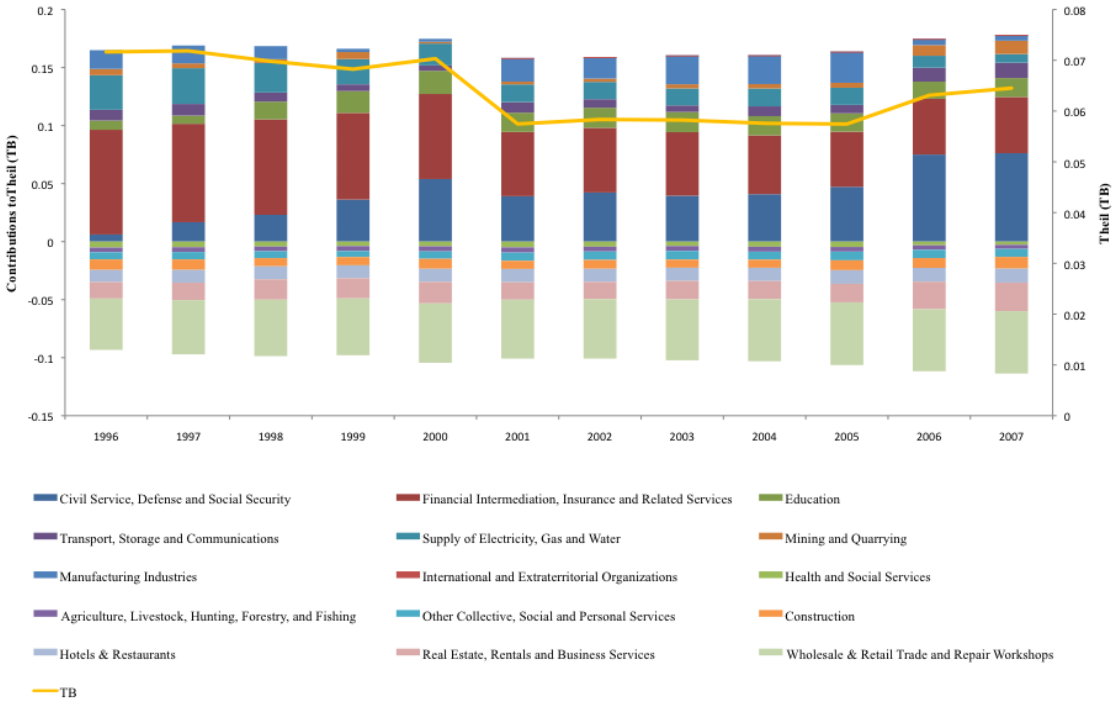
Despite significant improvements in its distribution of income, income inequality remains very high in Brazil and continues to be a challenge for policy makers.

The following section presents trends in pay inequality according to the calculation of Theil's T statistic using data on average wages by sector and geographic unit.

THE EVOLUTION OF INTER-SECTORAL INEQUALITY IN BRAZIL

This research identified 15 sectors into which Brazil's economy can be consistently divided across the years of study using the CNAE categorizations for reporting of economic data for the years before and after 2007 (CNAE 1.0, and 2.0, respectively). Calculating the between-groups component of Theil's T statistic by economic sector for each year between 1996 and 2007 provides a trend in overall inter-sectoral inequality in Brazil and reveals the contributions of each economic sector to overall pay inequality, as shown in Figure 6-1. Similar to what is observed in the chapter on Argentina, the biggest changes in inequality in Brazil during the period of study are produced in the same period of time that significant reforms to Brazilian monetary policy were taking effect. In 1999, in response to the banking and financial crisis that was occurring at this time, Brazil abandoned the Plan Real and its quasi-fixed exchange rate in favor of a floating exchange rate. This resulted in the devaluation of the Brazilian Real from dollar parity in 1999 to as much as 4 to 1 in 2002. The shift in inequality that is observed at the sectoral level in Figure 6-1 is also reflected at the regional level, as subsequently discussed in this chapter.

Figure 6-1. Pay Inequality by Economic Sector (overall trend and contributions)



Source: Author's calculation based on CEMPRE data.

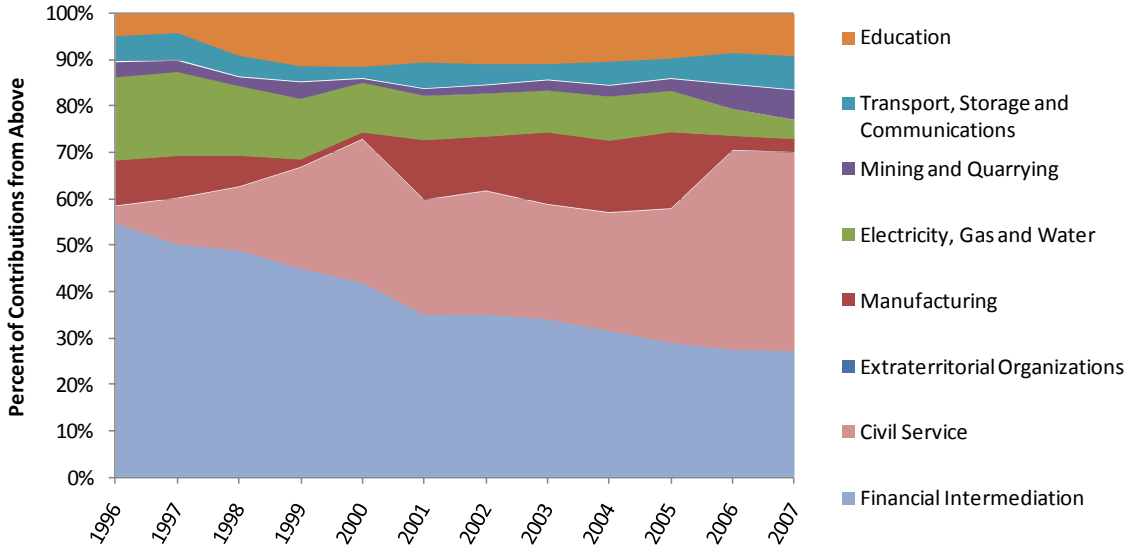
The reference period has four stages. During the first stage, from 1996 to 2000, inequality is at its highest and remained fundamentally stable. In the second stage, from 2000 to 2001, inequality decreased. During the third stage, from 2001 to 2005, inequality remained essentially stable, followed by the last stage, from 2005 until 2007, in which inequality again increased.

As shown in Figure 6-1, there are eight "high pay" sectors in which average wages exceed the average wage in the overall economy (the national average) across the entire period of study (1996-2007). These high-pay sectors contribute to overall pay inequality in Brazil from above: (1) civil service, defense and social security (henceforth referred to as "civil service"); (2) financial intermediation, insurance and related services (henceforth "finance"); (3)

education; (4) transport, storage and communications; (5) supply of electricity, gas and water; (6) mining and quarrying; (7) manufacturing; and (8) international and extraterritorial organizations (listed in descending order in terms of contributions to inequality from above in the last year, 2007).

While all eight of these sectors contributed to inter-sectoral pay inequality from above, two sectors stand out as being major contributors to overall pay inequality in Brazil between 1996 and 2007: civil service and finance. These two sectors made between 57 and 73 percent of the contributions to overall pay inequality from above during this period. As will be demonstrated in this chapter, these two sectors provide examples of two very different ways in which a sector (or any other group for which the Theil's T statistic is calculated) can make a large contribution to Theil's T – one by providing good wages to a large number of people, and the other by providing significantly above-average wages to a much smaller group of people. The two sectors also follow remarkably different trajectories across the period of study, succinctly encapsulating the events of the 12 year period: the contributions of the financial sector followed a decreasing trend across the period of study while the contributions of the civil service sector grew considerably during the whole period.

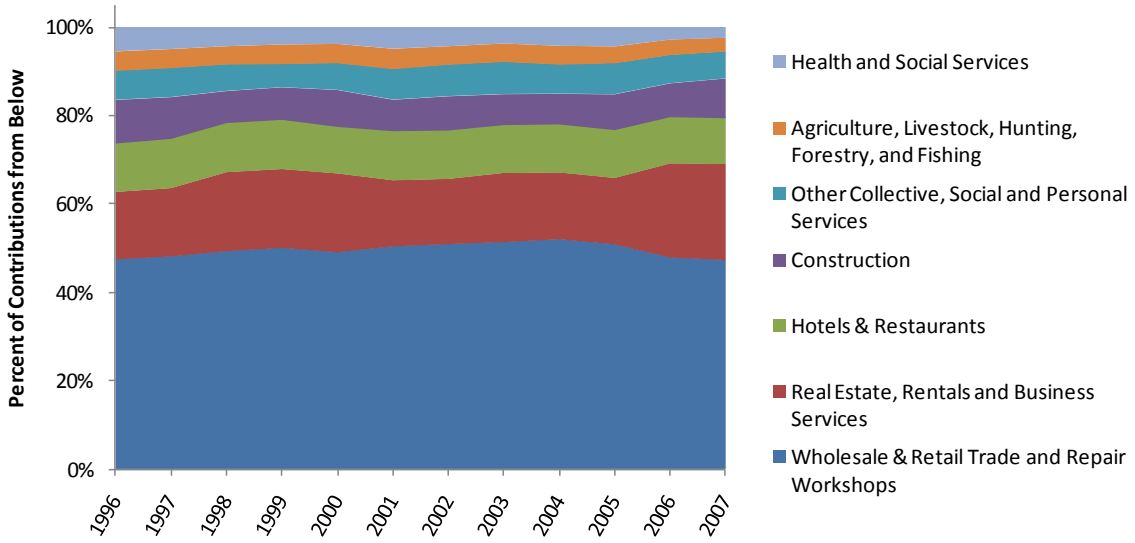
Figure 6-2. Relative Contributions to Overall Inequality, From Above



Source: Author's calculation based on CEMPRE data.

The sectors that contributed the most to inequality "from below" appear below the zero line in Figure 6-1: (1) health and social services; (2) agriculture, livestock, hunting, forestry, and fishing; (3) other collective, social and personal services; (4) construction; (5) hotels and restaurants; (6) real estate, rentals and business services; and (7) wholesale and retail trade.

Figure 6-3. Relative Contributions to Overall Inequality, From Below



Source: Author's calculation based on CEMPRE data.

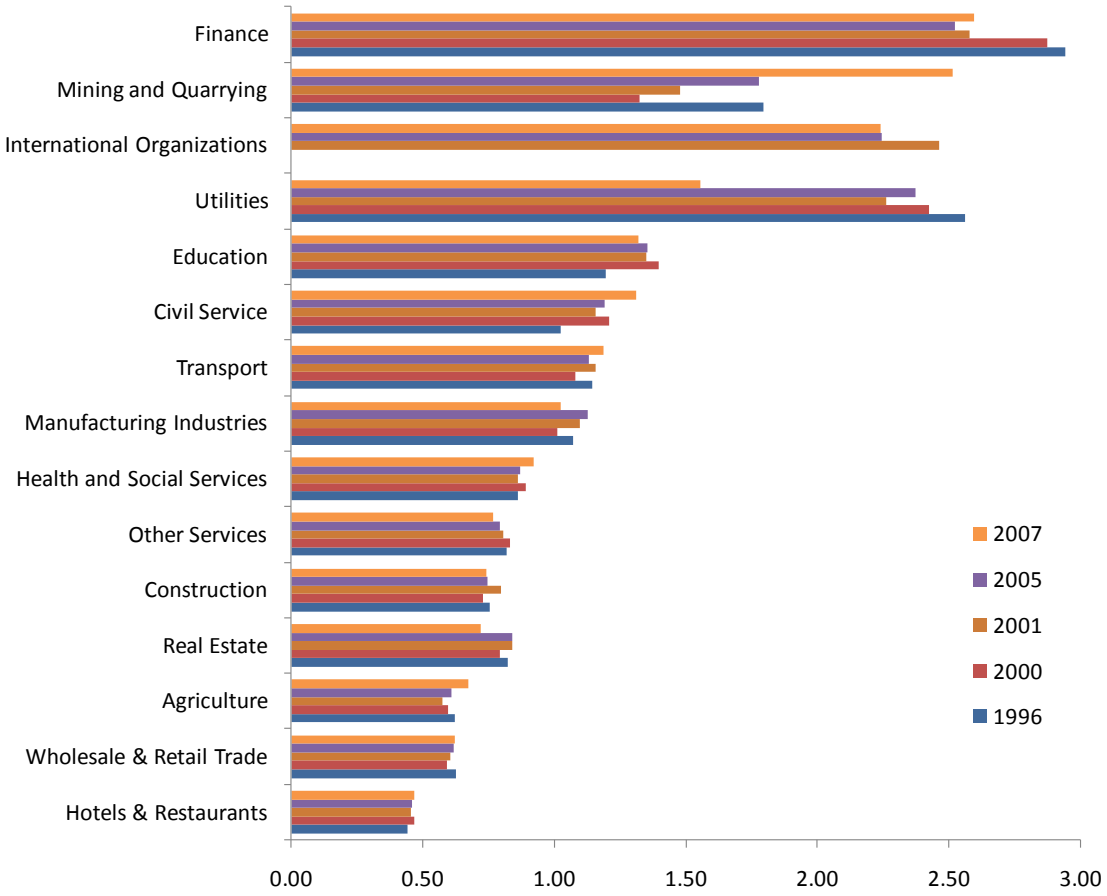
Among these sectors, the most significant in terms of their contributions to total pay inequality from below were wholesale and retail trade; real estate, rentals and business services; and hotels and restaurants. As detailed in the discussion of "contributions to Theil's T from below" section of the Methods chapter, the size of a below average-wage sector's contribution to Theil's T (from below) increases with (1) the difference between relative wages in that sector and the overall average wage, and (2) with increasing employment in that sector. The sectors that make the largest contributions from below to Theil's T as calculated for Brazil employ a significant share of the population employed, but workers in these sectors manage to take home a relatively small portion of the national income.

Relative Wages and Employment Levels

The decrease in Brazil's overall pay inequality between 2000 and 2001 (Stage 2) follows the significant decline in contributions to inequality from the financial and civil service sectors between 2000 and 2001.[93] These two sectors' decreasing contributions can be related to the decreases in their relative average wages in those two years, as depicted in Figure 6-4 (as shown in Figure 6-5, employment in these two sectors did not change significantly from 2000 to 2001). The increase in Brazil's overall pay inequality after 2005 (Stage 4) largely follows the increasing contribution of the civil service sector since 2005. In observing trends in employment shares and average wages, this civil service-driven increase becomes all the more striking: relative employment in the civil services actually decreased by 1 percent from 2005 to 2007 (Figure 6-5), meaning the increase in its contribution to income inequality was entirely an income effect. As can also be seen in Figure 6-4, the relative average wage in the civil services sector increased from 1.2 times the national average wage in 2005 to 1.3 times the average wage in 2007, in a period in which average wages were rising across the economy (they rose by almost 20 percent).

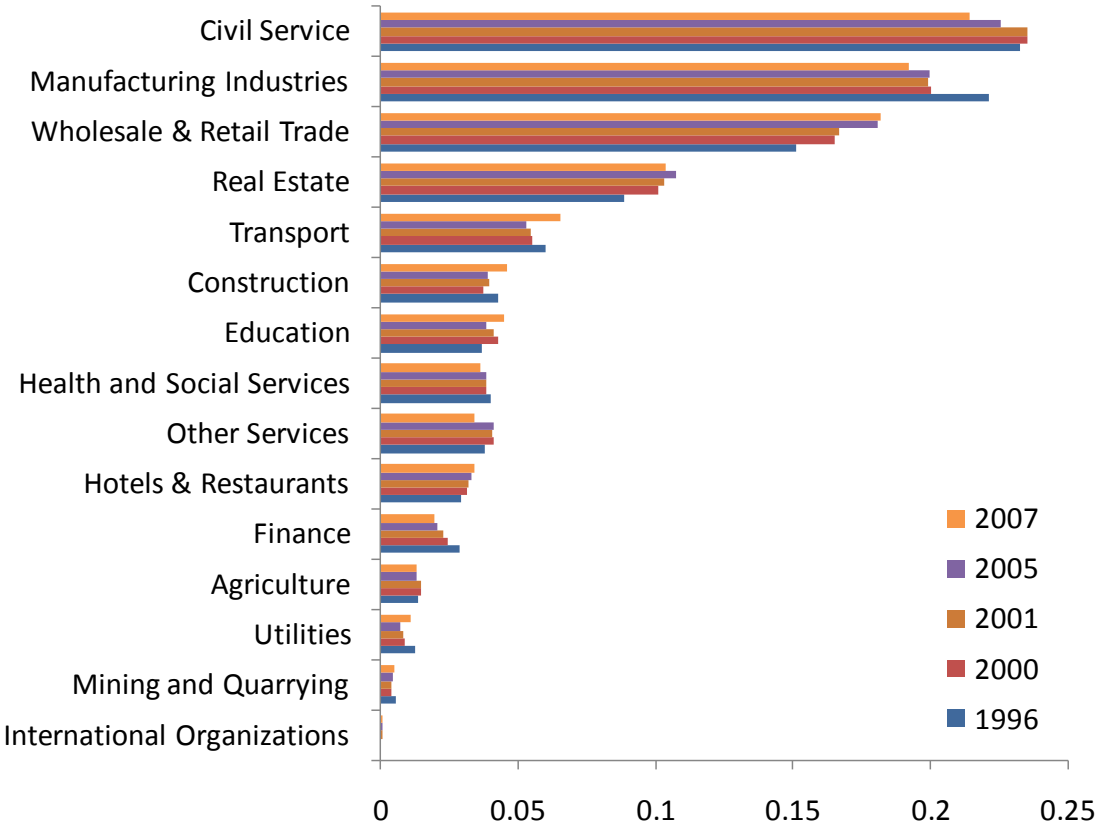
[93] The contributions to between-sector inequality from civil service and finance actually decreased by 2.5 times the total decrease (contributions of other high-wage sectors increased, and the negative contributions of some below-average sectors simultaneously decreased, offsetting the overall decrease).

Figure 6-4. Trends in Relative Average Wages



Source: Author's calculation based on CEMPRE data.

Figure 6-5. Employment Shares in 15 Brazilian Economic Sectors



Source: Author's calculation based on CEMPRE data.

Conclusions – income inequality between sectors

Changes in pay inequality in Brazil during the period of study are largely explained by the fall of the financial sector and the rise of the civil service sector. The share of income accorded to the financial sector is the dominant trend for 1996, 1997, 1998 and 1999: during this period, the civil service sector made a small, although increasing, contribution. This dynamic begins to change more rapidly in 1999, as in that year the contribution of the financial sector begins a decline that continues to the end of the period, while that of the civil service sector increases by more than 50 percent. After falling between 2000 and 2001

(the contributions of both sectors fell), inequality is stable between 2001 and 2005, and the contributions of the civil service sector and financial sector were relatively constant. The contribution of the civil sector spikes in 2006, surpassing that of finance and making the former the biggest contributor to inter-sectoral pay inequality in 2006 and 2007.[94]

Evolution of Inter-Sectoral Inequality– excluding the financial sector

This section employs a counterfactual to isolate the contributions of the financial sector, attempting to answer the following question: *What would the trends in inequality in Brazil have been absent the contributions of the financial sector?* Removing the financial sector from the picture highlights the dynamics of relative inequality among the remaining sectors of the economy across the period of study.[95]

This counterfactual can be estimated using Theil's T by simply removing all employment and wages earned in the financial sector from the base data sets used to calculate Theil's T, recomputing population shares and income shares for the remaining sectors based on the modified data set, and recalculating each sector's contributions to inter-sectoral inequality.

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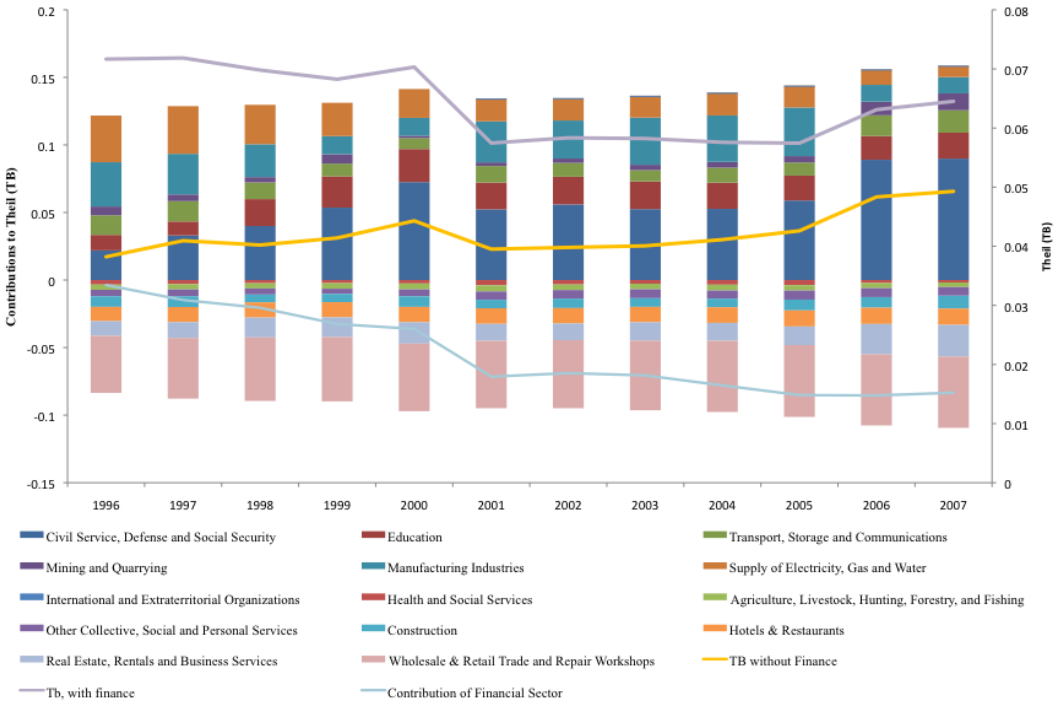
[94] Because wages in the civil service sector are not far above mean wages, one might expect that the increasing importance of the civil sector since 2006 is representative of a population effect. However, as shown in the Appendix (Figure A-1), when the population employed in each sector is fixed to 1996 levels, the evolution of inequality, and in particular of the role of the civil service sector, is essentially unchanged, implying that an income effect drove the sector's rise. In fact, the population share of the civil service sector in the last three years was at its lowest at any point in the time period: from an initial level of about 23.3 percent it rose to its peak in 1999 of about 25 percent, from which it declined to just 21.5 percent by 2007.

[95] It should be noted that this counterfactual does not presume to represent a hypothetical Brazil that has no financial sector - clearly, incomes in other sectors are tied to interactions with the financial sector, the effects of which cannot be erased by removing financial sector employment and earnings from the data.

Figure 6-6. Contributions to overall pay inequality by economic sector excluding finance, with total between sector inequality and the contribution of the financial sector overlaid



Source: Author's calculation based on CEMPRE data.

The stacked bars in Figure 6-6 represent each sector's contribution to pay inequality in the counterfactual exercise. Figure 6-6 also includes the actual total inter-sectoral inequality (including the contributions of the financial sector), as computed for Figure 6-1 (the top line), total inter-sectoral inequality excluding the contributions of the financial sector (the middle line) and the difference between total inter-sectoral inequality as calculated with and without the financial sector (the bottom line).

Fundamentally, Figure 6-6 shows a lower level of inter-sectoral inequality in Brazil absent the financial sector (as is to be expected - removing one of the highest-wage groups decreases the overall average wage and compresses the

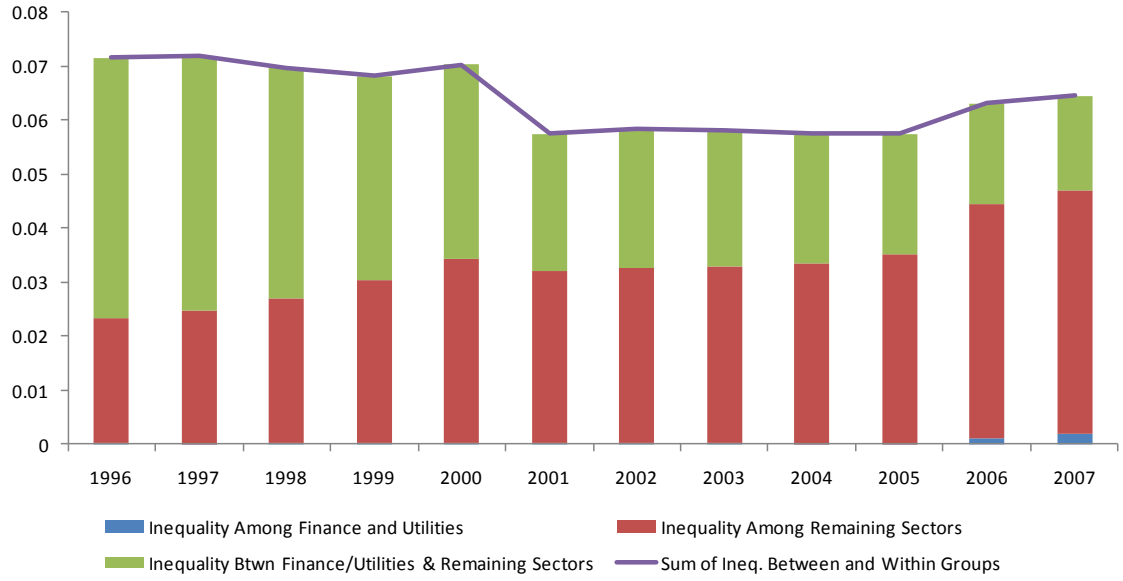
distribution, resulting in lower inequality). The initially large but diminishing role of the financial sector is clearly shown by the bottom line.[96] Figure 6-6 also shows that the general trends in inter-sectoral inequality are the same with or without the financial sector (top two lines), particularly from 2000 to the end of the period, indicating the decreasing role of the financial sector in driving Brazilian inequality.

Ascendant Sectors and Sectors in Decline

This section presents two analyses in which the economy is divided into two different groupings of economic sectors to complete the picture of changing fortunes in these major sectors in the Brazilian economy and demonstrate how these changes are the driving forces in changing levels of inequality in Brazil. By combining certain sectors into groups, the information about each sector's contribution is maintained, allowing the inequality within each group to be computed. The sum of these within-groups and between-groups inequality provides an estimate of overall pay inequality. As can be seen in Figure 6-7, the overall trend is the same as the computed pay inequality between sectors as in Figure 6-1.

[96] By definition, the difference between total inequality and inequality absent the financial sector represents the financial sector's contribution to overall inequality.

Figure 6-7. Sectors in Decline (finance and utilities) versus Remaining Sectors



Source: Author's calculation based on CEMPRE data.

First, the economic sectors are divided into two groups: finance and utilities on the one hand, and the remaining sectors on the other hand. Finance and Utilities are the two sectors in which relative average wages decreased the most across the period of study (except real estate, which experienced a similarly large decline, but is of less significance to the overall economy). As such, these two sectors can be considered ***sectors in decline*** during the period of study.

This new grouping demonstrates again the overall trend, but also shows the contributions of all three components: the inequality within both of these groups and the inequality between them. As Figure 6-7 shows, the inequality *between* these two groupings (the sectors in decline and all other sectors) explains more than half of the measured inequality between 1996 and 1998 - a finding made only more remarkable when one considers that in those years these two sectors employed less than 5 percent of the population. The steep decline in

overall inequality in 2001 is composed of decreases both in inequality within the remaining sectors and inequality between the two groups; however, the majority of the decline (66 percent) is explained by the decrease in inequality between the two groups, itself a result of declining relative wages in the sectors in decline (combined with minor decreases in both sectors' employment shares).

Both the inequality between the groups and that within the "remaining sectors" group are stable between 2001 and 2005, so overall pay inequality is also steady.[97]

The final important observation from Figure 6-7 is that inequality between the two groups decreases even further after 2005, but overall inequality goes up due to a large increase in inequality among the remaining sectors (as can be seen in the increasing height of the red columns in 2006 and 2007). As Figure 6-1 begins to show, this increase is primarily due to large increases in relative wages in the civil service sector (in conjunction with that sector's high levels of employment), but is also due to increasing contributions from another sector: mining and quarrying (which includes petroleum). This observation allows for the creation of a group of ***ascendant sectors***.[98]

The role of the two ascendant sectors (civil service and mining) in driving increasing inequality in the last two years of study is demonstrated by isolating these two sectors from the "remaining" sectors of the economy, in the same way

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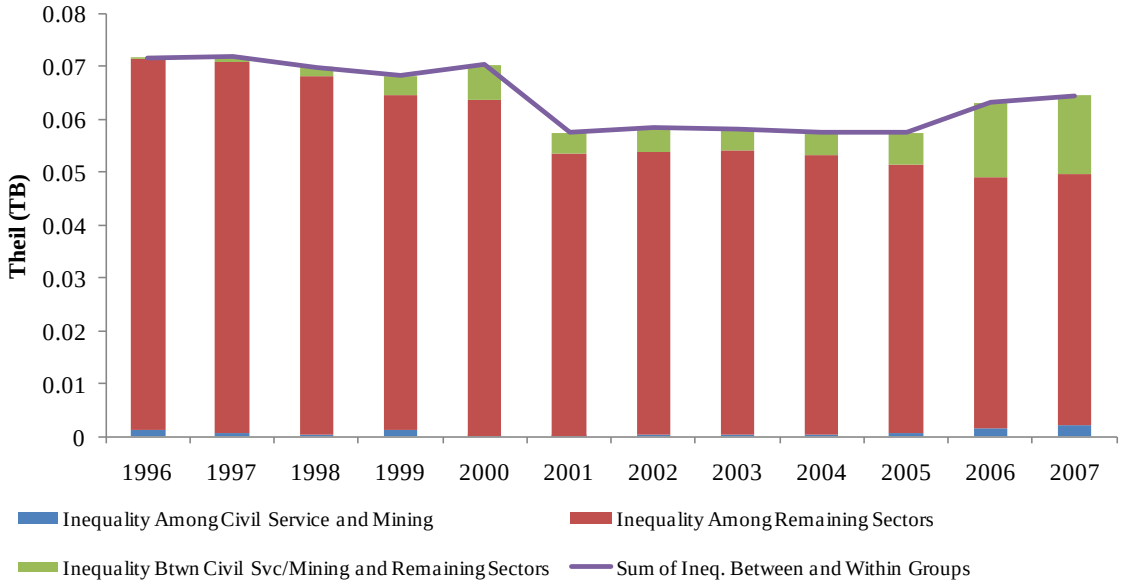
[97] Note that only in the final years of the period is inequality within the *sectors in decline* group even observable; as such, it is largely ignored in this analysis.

[98] Growth in the mining sector is similar to what is observed in this period in Argentina and Chile: it is at least partially explained by increasing global demand, particularly from China, and the accompanying rise in commodity prices in international markets. In Brazil's' case, petroleum has been particularly important due to recent offshore discoveries and the growing profile of Petrobras, the state-run oil company.

as the declining sectors (finance and utilities) were previously isolated. Figure 6-8, which takes the same form and follows the same conventions as Figure 6-7, provides the results of this operation.

Figure 6-8. Ascendant Sectors (civil service and mining) versus Remaining Sectors



Source: Author's calculation based on CEMPRE data.

In the ascendant group, employment in the civil service sector dominates that of the mining sector, with 98 percent of the group's employed population. At the beginning of the period of study, the average wage in the civil service sector was only slightly higher than the average wage earned in the overall economy. This explains why there is almost no inequality between the ascendant group and the remaining sectors of the economy during the first years of the period of study. However, inequality between this group and the remaining sectors increases across the period, with a significant jump occurring between 2005 and

2006. While the overarching impression from Figure 6-8 is that most of the inequality is within the remaining sectors group (between those sectors), the figure serves to highlight the growth in the contributions of the civil services and mining sectors to overall inequality by the end of the period.

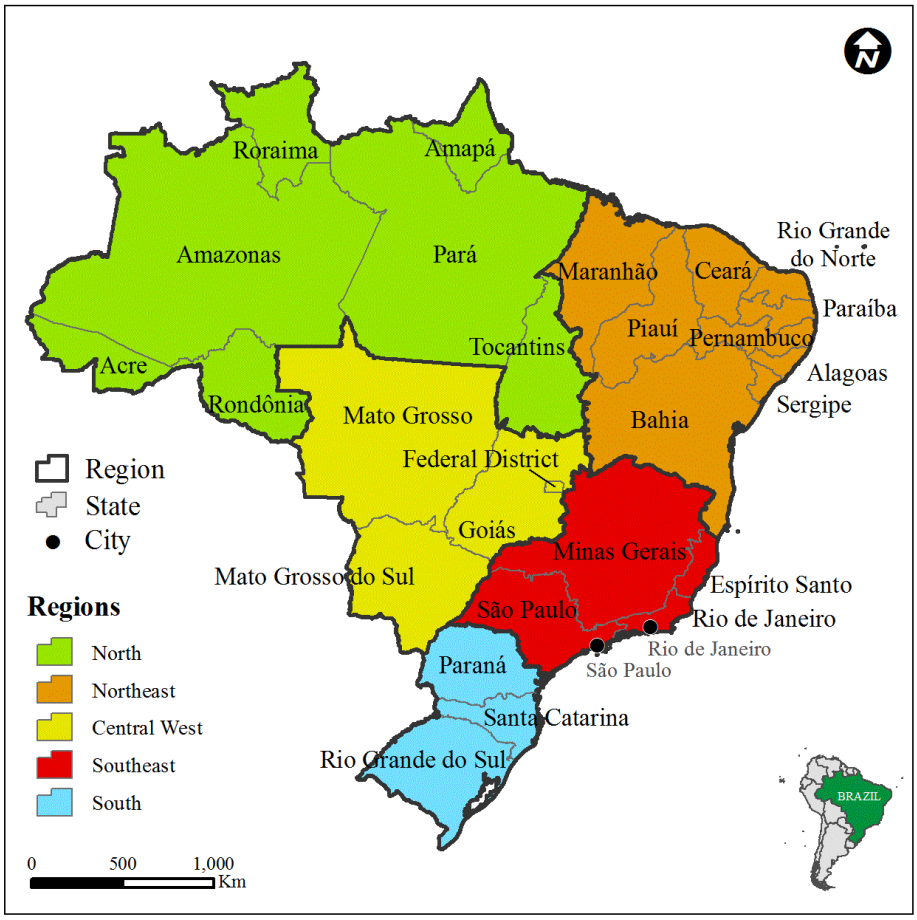
Taken together, Figures 6-7 and 6-8 provide straightforward insights into the dominant trends driving changes in inequality in Brazil across the period of study. Figure 6-7 shows the decreasing contributions of the financial sector and the utilities sector across the period of study. Figure 6-8 shows the increasing contributions of the civil service and mining sectors.

REGIONAL PAY INEQUALITY: INEQUALITY BETWEEN AND WITHIN REGIONS

This section presents analysis of Brazilian inequality at three geographic levels (regions, states, and municipalities), showing variations in the distribution of income across and within these different levels of geographic groupings.

For this study, regions are grouped according to the groupings used by Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica, or IBGE), as shown in the map in Figure 6-9. Brazil is divided into 26 states and one federal district, which are combined into five regions: north, northeast, central-west, southeast and south.

Figure 6-9. Brazilian states and regions

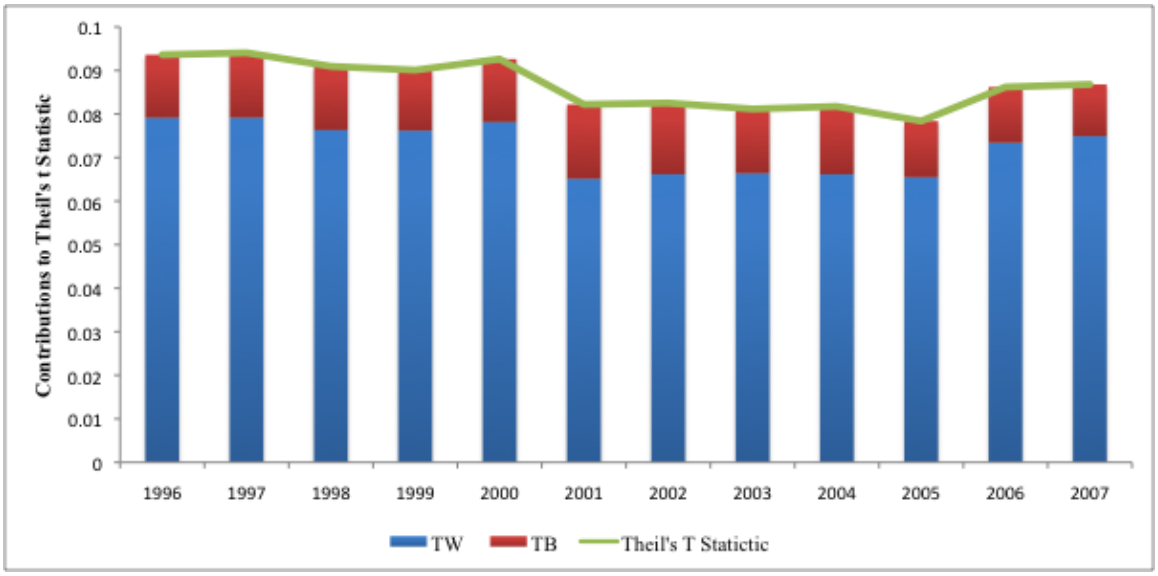


Source: Author.

Between and Within Region Inequality

This section begins with a calculation of overall regional inequality and disaggregation into two components: the proportion explained by inequality between regions (the between group component) and that due to inequality within regions (the within group component).

Figure 6-10. Between and Within Regions Contributions to Brazilian Inequality



Source: Author's calculation based on CEMPRE data.

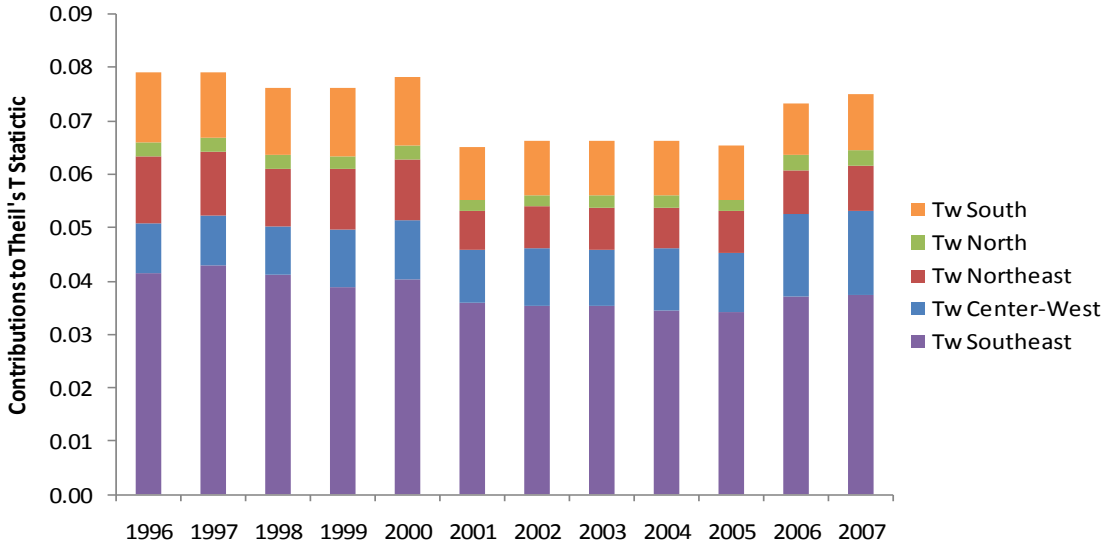
The between regions contribution is represented by the area in each column colored in red, while the within region contribution is represented by the area in each column colored in blue. Overall inequality - the sum of the between region and within region inequality, where the latter is the summation of inequality between economic sectors within each region weighted by each region's share of the national income - is represented by the green line.

Figure 6-10 indicates that overall regional inequality in Brazil was essentially stable from 1996 to 2000, after which there was a strong reduction in 2001. From 2001 to 2005, inequality was again quite stable, followed by the last stage, from 2005 until 2007, in which inequality increased (though not enough to reach pre-2001 levels).

Figure 6-10 shows that pay inequality within regions in Brazil is larger than that between regions. This result is not surprising; in general, inequality

within groups is larger than inequality between groups. The decrease (fluctuations) in overall pay inequality appears to be explained almost completely by the fluctuations in the within-group component of overall pay inequality.

Figure 6-11. Within Region Contributions to Regional Inequality

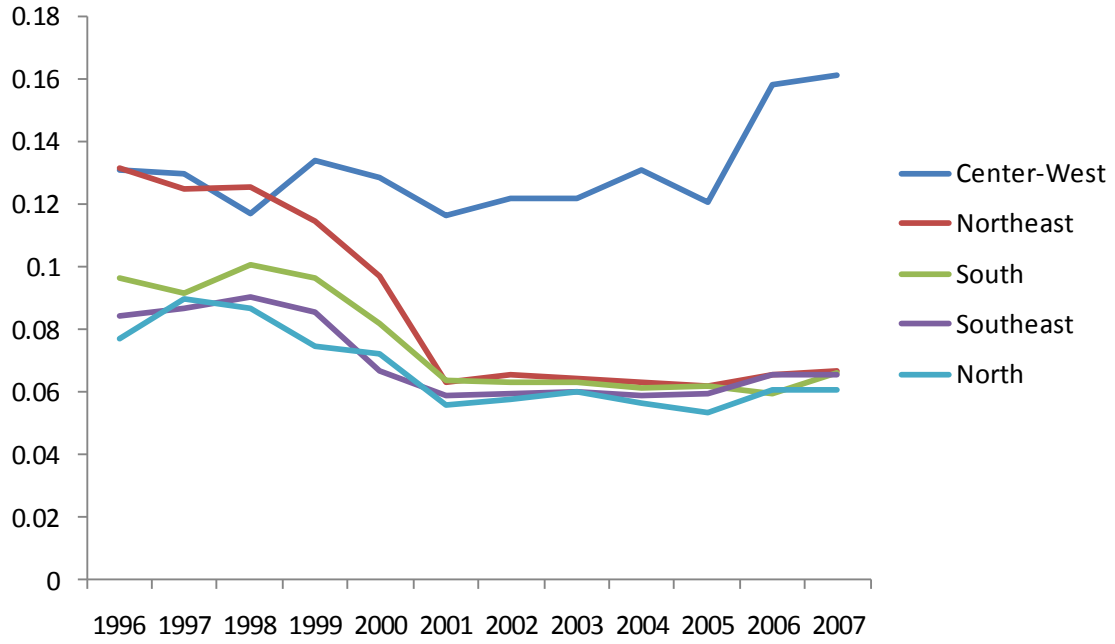


Source: Author's calculation based on CEMPRE data.

Only within-region contributions (the blue portion of the bars in Figure 6-10) are included in Figure 6-11: inequality between the regions is left out. The southeast region is the major contributor to inequality within regions (about half of all the inequality within regions is within this one region). The remaining 50 percent of inequality within the regions is distributed among the other four regions: inequality within the Center-West region grew across the period of study, but as the center-west region became relatively more unequal, relative inequality with the South and northeast regions diminished. This decrease is

observed most dramatically by observing the un-weighted inequality between sectors within each region, as depicted in Figure 6-12.

Figure 6-12. Un-weighted between-Sector Inequality within Each Region



Source: Author's calculation based on CEMPRE data.

Inequality between sectors is greatest in the Center-West region: whereas within-region inequality in all other Brazilian regions decreased in the period of study, inequality in the Center-West increased.[99] This is largely a function of increases in the relative wages and population employed in civil services in this region (see Figure C-3, Appendix C). The large decline in inequality within the Northeast region is largely a function of the relative decline of the finance sector

[99] While the Center-West region has the highest level of between-sector inequality, its income-weighted contribution, as depicted in Figure 11, appears much less significant than that of the Southeast region. This is because about 60 percent of Brazilian salary income is earned in the Southeast region, while only 10 percent is earned in the Center-West.

(see Figure C-4, Appendix C). While the within region contribution from the north (region) has slightly increased, the within region contribution to Brazilian inequality of the south and northeast region decreased.

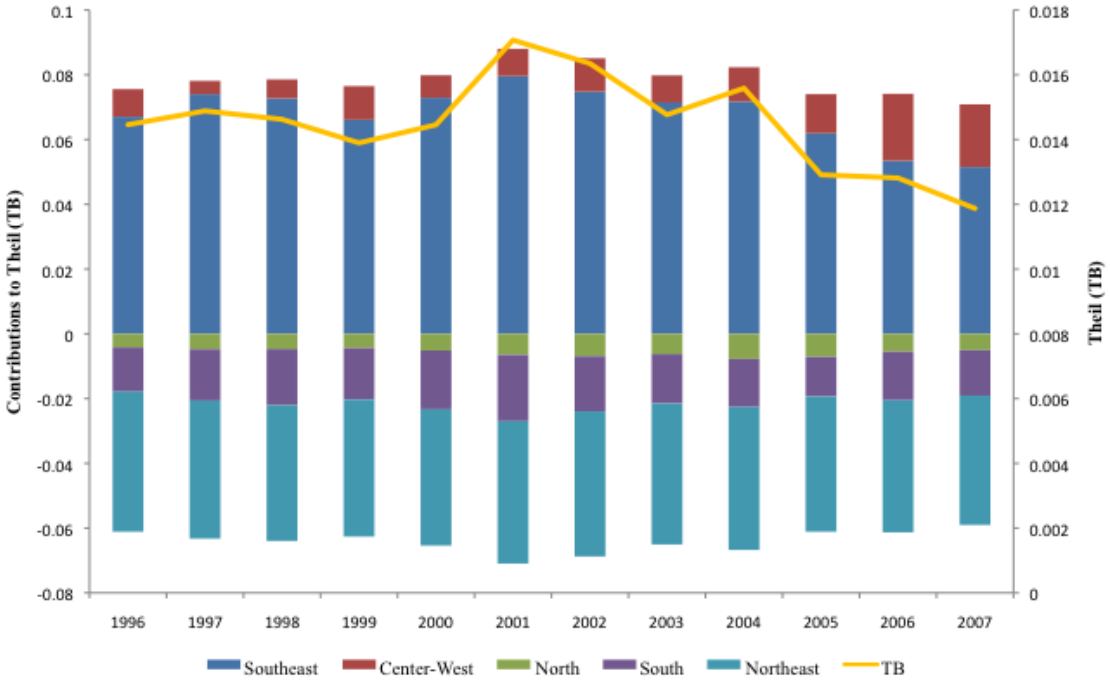
Reductions in inequality within the southeast and northeast regions are largely responsible for the reduction in inequality within regions observed between 2000 and 2001 (as depicted in Figure 6-11). The increase from 2005 to 2007 includes an increase in the contribution of the southeast region, but is mostly explained by an increase in inequality within the Center-West region.

What underlies these trends are the following: (1) the decreasing contribution of Sao Paulo, reducing the gap between it and other states in the Southeast region, and (2) the increasing contributions from the Federal District and its large civil service sector, putting space between it and other states in the Center-West Region.

PAY INEQUALITY BETWEEN REGIONS

Disaggregation of the between-groups component of regional inequality (the red portion of the bars in Figure 6-10), provides further confirmation of the importance of the southeast and center-west regions as the drivers of pay inequality. As can be seen in Figure 6-13, these two regions are the only regions with above average pay. Furthermore, the rise and fall of between-region inequality across the period tracks the increase and decrease of the contributions of the southeast region.

Figure 6-13. Inter-regional Brazilian Inequality



Source: Author's calculation based on CEMPRE data.

General Trends

Inequality between regions rose until 2001 and then decreased during the rest of the study period (2001-2007). This runs counter to the trends observed in the analysis of regional pay inequality (of which this T^B is a part) in two important ways: (1) whereas overall regional inequality (including the within-regions component) decreased from 2000 to 2001 and then remained stable until 2005, inter-regional inequality initially increased (especially from 1999 to 2001) and began to decrease in 2002, and (2) rather than increase in the last two years of study, inter-regional inequality continues to trend downward.

Overall, there was no significant realignment among regions with high and low wages during the period of study: the same regions remain above and below the zero line across the period of study. However, there were some changes in the sizes of contributions to regional inequality among high-wage regions and among low-wage regions. In particular, declining contributions from the Southeast region that begin in 2001 are a result of both population and income effects: at the same time that relative employment in the southeast region is declining, wages in the other regions of the country are improving relative to those earned in Brazil's primary economic engine, the southeast region that includes Sao Paulo, Rio de Janeiro, and the industrial stronghold of Minas Gerais. These changes explain the increasing trend in regional inequality until 2001 and the decreasing trend since that time.

Contributions

The regions that contributed to inequality "from above" are those high-paying regions with average wages above the national average - those appearing

above the zero line in Figure 6-13 - the southeast and the center-west. The regions that contributed to inequality "from below" are those low-paying regions with average wages below the national average - those appearing below the zero line in Figure 6-13 - the northeast, the south and the north.

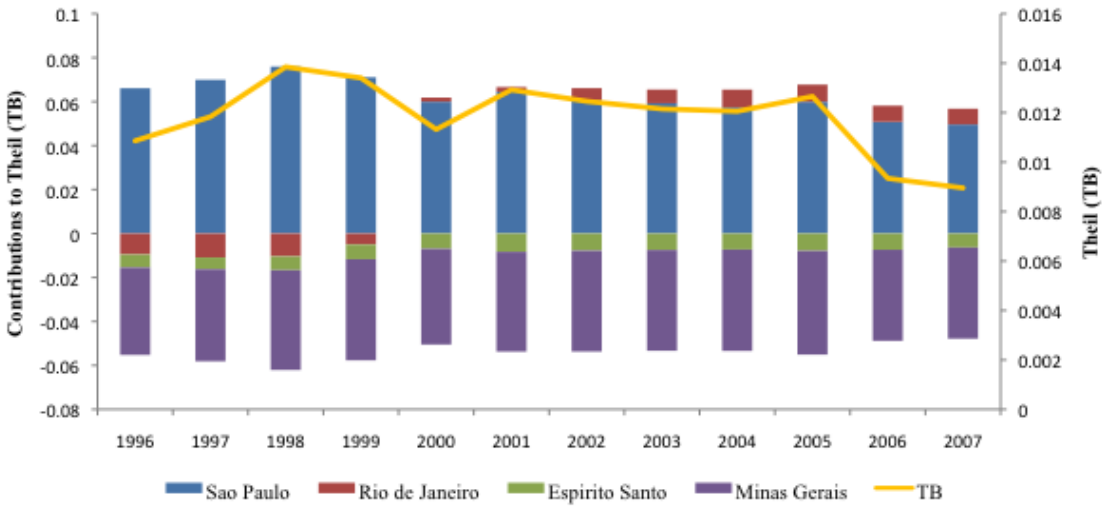
What is clear is that the evolution of inter regional inequality in Brazil is explained to a great extent by variations in the performance of two high-paying regions, the southeast and center-west regions. The changing contributions of the southeast region alone played a leading role in driving not only the increasing trend until 2001 but also the decreasing trend that followed. Since 2001, this region has lost relative position, while that of the center-west region has improved (especially in 2006 and 2007).

Disaggregating the data for the southeast and center-west regions by economic sector permits analysis of the contributions of these two regions' economic sectors to the inequality within each region, providing insight into drivers of these two regions' changing (relative) fortunes. Stack bar graphs for the two regions are provided in Appendix C (Figures C-2 and C-3): analysis of these graphs shows, for both regions, increasing contributions of the civil service sector and decreasing contributions from the financial sector, as observed across the economy in the sectoral analysis, as depicted in Figure 6-1.

Taking further advantage of the properties of Theil's T statistic, analysis of inequality between the states of each region helps explain which states within these two regions drove the changes in the general trends in inequality. The southeast region is composed of the following states: Minas Gerais, Espirito Santo, Rio de Janeiro and Sao Paulo. As Figure 6-14 shows, the fluctuations in the

overall trend in this region were mainly associated with the changing contributions of two states: Sao Paulo and Rio de Janeiro. Figure 6-14 shows that Sao Paulo gained relative position until 1998, after which it lost relative position, reaching its lowest level in terms of its contribution to Theil's T statistic in 2007. Given the significant presence of the financial sector in this state, this result is in keeping with observations from the sectoral inequality analysis, in which the financial sector saw its relative position diminish across the country after 1999. Conversely, during the period before the banking crisis (1996-1999), wages in Rio de Janeiro were below the regional average. However, in 2000 this trend reversed, and Rio de Janeiro state's wages exceeded the regional average for the remainder of the period of study.

Figure 6-14. Inequality between States within the Southeast Region



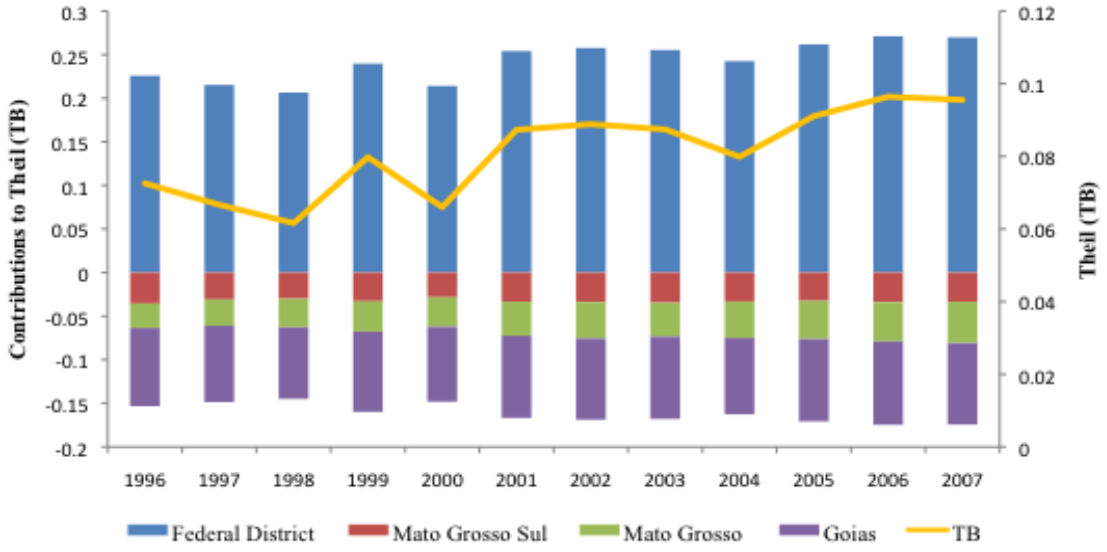
Source: Author's calculation based on CEMPRE data.

There are two opposing trends: whereas Sao Paulo's contribution is decreasing since 1999, that of Rio de Janeiro begins to increase in the same year

(becoming less negative in 1999, then positive in 2000, and growing from there). However, the relative growth of Rio de Janeiro's contribution is not big enough to offset the reduction in that of Sao Paulo. This helps explain why the Southeast Region's contribution to regional inequality has been decreasing since 2001 and, correspondingly, why overall regional inequality has decreased (see Figure 6-13).

On the other hand, the center-west region includes the following states: Mato Grosso Sul, Mato Grosso, Goias and the Federal District. As mentioned before, the center-west region became a larger contributor to overall inequality in Brazil during the period of study (especially in 2006 and 2007).

Figure 6-15. Inequality between States within the Center-West Region



Source: Author's calculation based on CEMPRE data.

As Figure 6-15 shows, the Federal District dominates the region, as wages there are sufficiently high that wages in all other states of this region are below the regional average. The important contribution of the Federal District is explained by the fundamental role of the civil services sector in this region.

Taken in conjunction with the observed increasing importance of the civil services in the country-wide sectoral analysis, increasing inequality between the Federal District and the other states in the center-west region is not surprising: it also helps explain the growing contribution of this region to regional inequality since 2001, even as overall inequality has decreased.

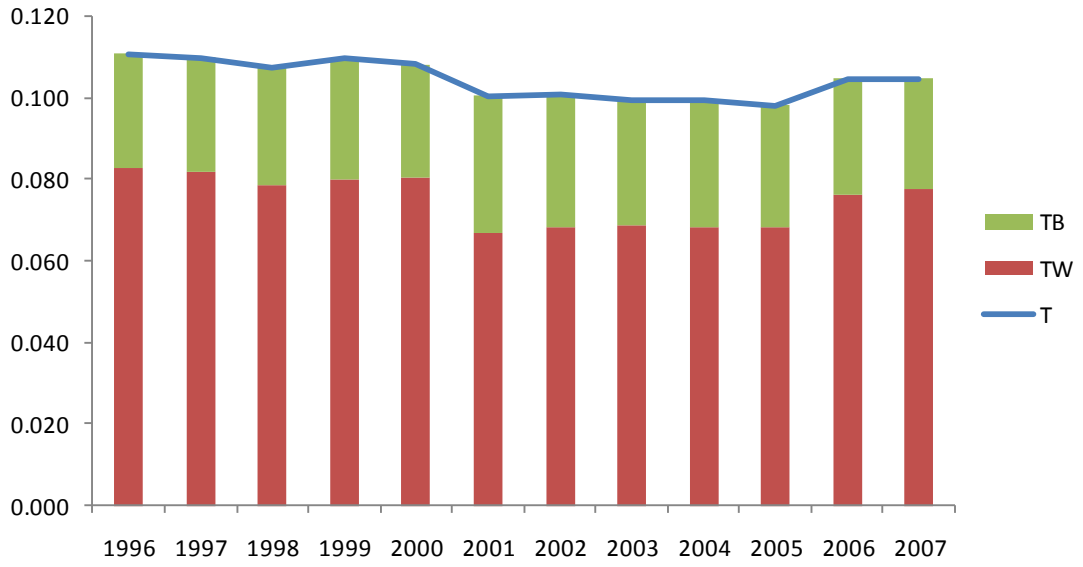
Preliminary Conclusions

Decomposition of Theil's T statistic into between regions and within regions components demonstrates that there is a convergence in the levels of income across regions, yet this convergence is not observed within the major regions of Brazil. In total, within-regions contributions were mostly stable (Figure 6-10 shows a large drop in 2001, and an increase of almost the same size in 2006), yet, while inequality between the regions was comparatively small, its fluctuations were more pronounced. Decomposition into the within-region contribution of each region shows that inequality within the center west region increased whereas inequality within the southeast region had decreased.

INEQUALITY BETWEEN AND WITHIN STATES

Overall geographic inequality at the state level is expressed as the sum of inequality between the states and that within each state. Given that the data for each sector within each state are mutually exclusive and collectively exhaustive (MECE), the within state inequality is calculated by taking the inequality between each state's economic sectors. The between-state component measures inequality between all the Brazilian states, while the within-states component is an aggregate of the weighted inequality within each state (weighted by relative pay) between their corresponding economic sectors.

Figure 6-16. Pay Inequality Between and Within States



Source: Author's calculation based on CEMPRE data.

The between state contribution is represented in Figure 6-16 by the area in each column colored green: the within region contribution is represented by the

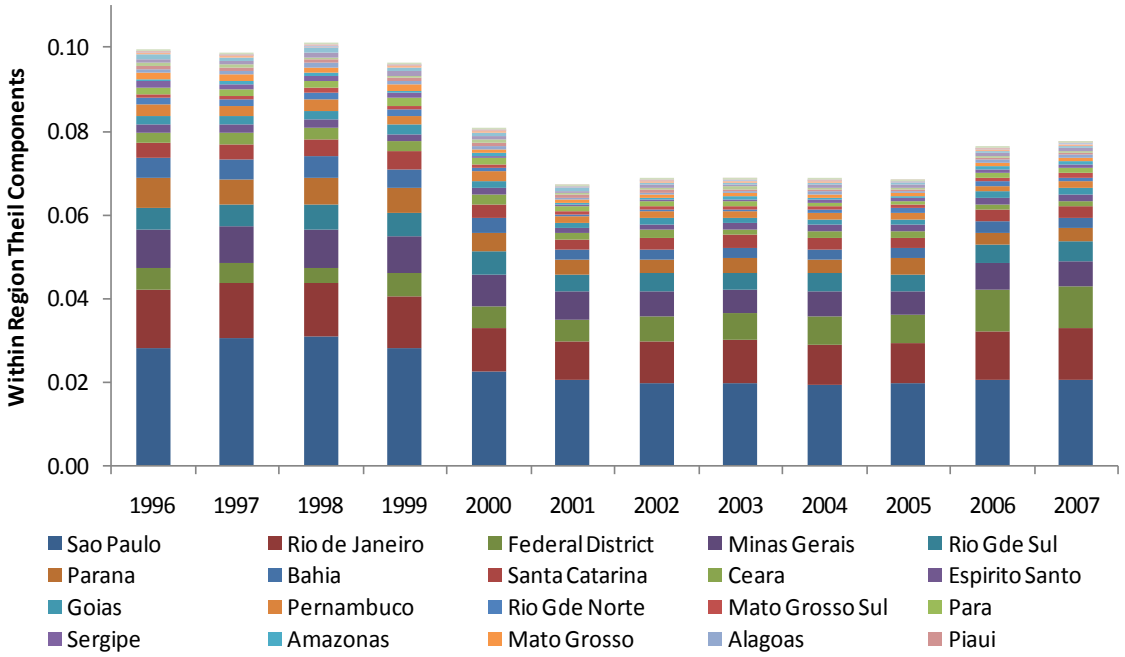
each column's red-colored areas. Overall inequality is represented by the blue line.

As with geographic inequality at the regional level, Figure 6-16 indicates that overall inequality at the state level decreased slightly from 1996 to 1998, increased slightly in 1998, and decreased from 1999 to 2001. From 2001 to 2005, inequality remained essentially stable, followed by an increase from 2005 to 2007.

Within State Inequality

As stated above, the inequality within each state can be estimated with employment and wage data aggregated by economic sector. These sectors are defined according to a standard set, such that all states have the same grouping structure: each state is partitioned into the same fifteen sectors. As such, application of Theil's T statistic to these data provides observations that are consistent with one another, facilitating comparison.

Figure 6-17. Income-Weighted Inequality between Sectors within Each State



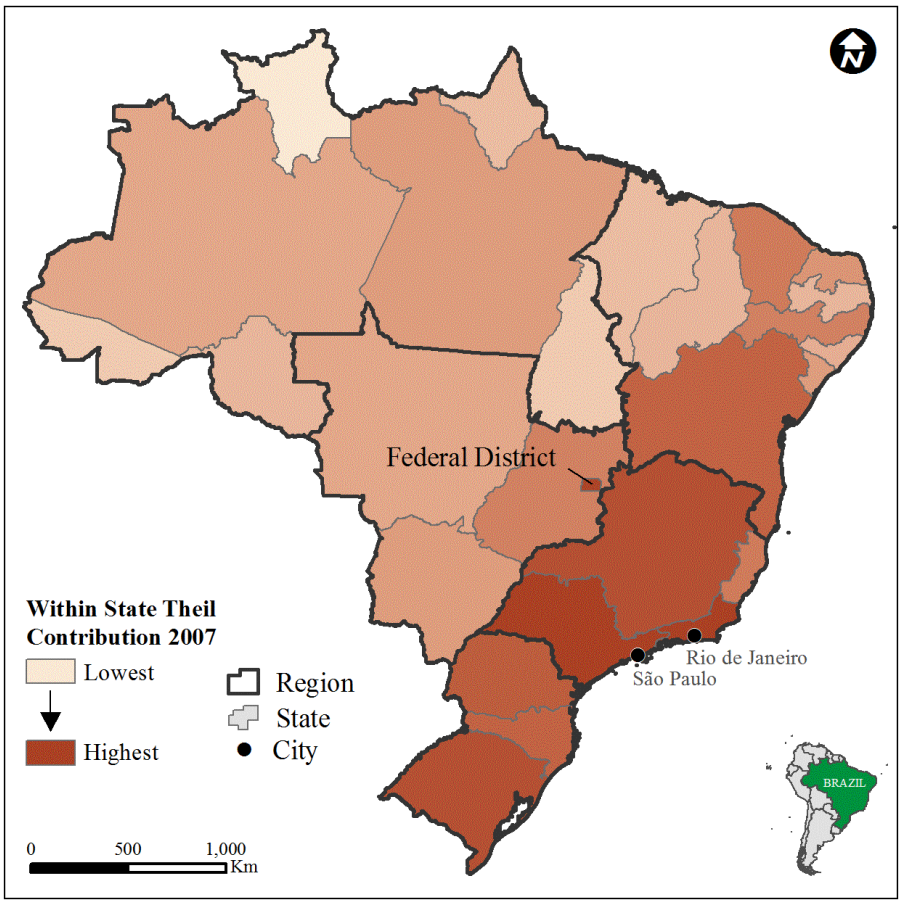
Source: Author's calculation based on CEMPRE data.

In Figure 6-17, the total contribution of inequality within states to overall pay inequality at the state level (the red portion of the columns in Figure 6-16) is disaggregated into each state's (income-weighted) contribution. The figure's most striking feature is the decline from 1999 to 2001: contributions of all but 5 states (none of which were significant) declined in this period, but the large decreases were in the contributions of Sao Paulo, followed by Rio de Janeiro, Parana, Bahia, and Minas Gerais. The increase from 2005 to 2007 is driven primarily by increasing contributions from the Federal District and Rio de Janeiro.

A snapshot of within state inequality as estimated using Theil's T statistic is provided in Figure 6-18 for the year 2007. As the map shows, within state

inequality generally increases from northwest to southeast. This trend is consistent across the period of study: relative levels of within state inequality are generally consistent.

Figure 6-18. Within States, Between-Sectors Theil's T Statistic (2007)



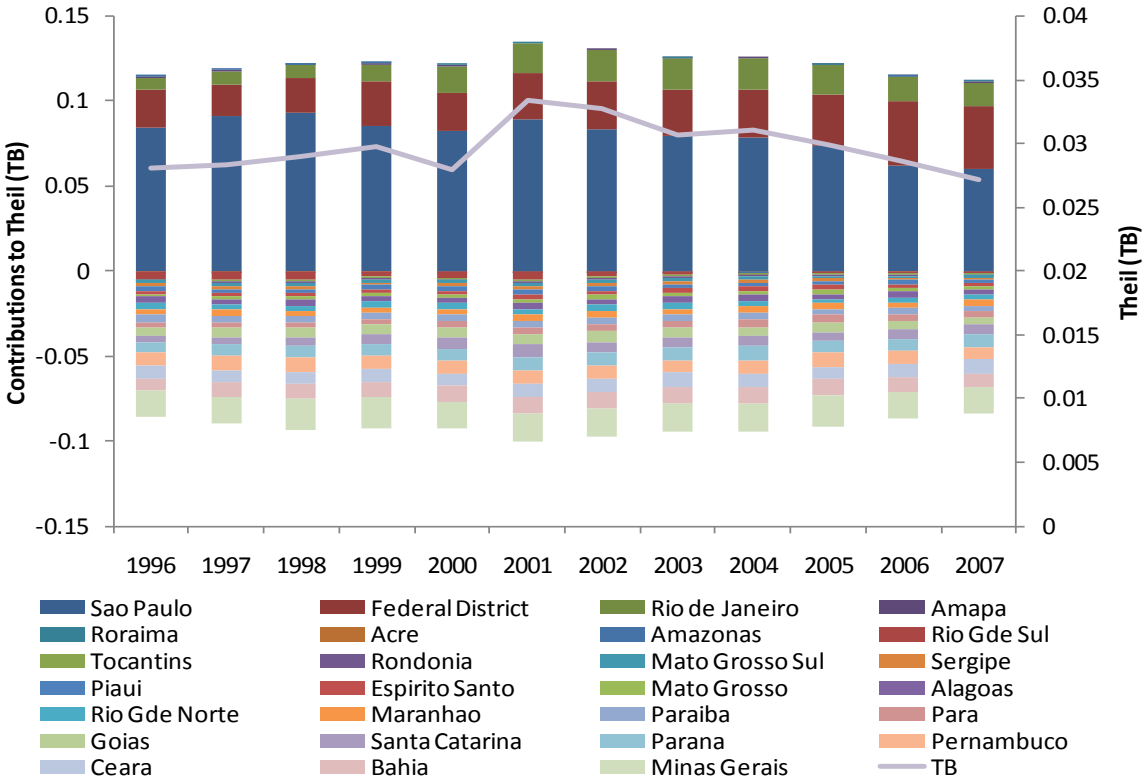
Source: Authors calculations based on CEMPRE data.

Between State Inequality

The between group component of Theil's T statistic estimated between states provides an overall trend in inter-state inequality as well as the

contribution of each state to this trend. These calculations are based on employment and average pay data for each of the 27 Brazilian states.

Figure 6-19. Pay Inequality between States



Source: Author's calculation based on CEMPRE data.

Figure 6-19 shows the movement of pay inequality by Brazilian states and the Federal District (Brasilia) between 1996 and 2007. The six states that contributed to inequality "from above" during the period of study are those with average wages above the national average in any given year (those appearing above the zero line in Figure 6-19). Of these, three states were significant contributors: Sao Paulo, Rio de Janeiro, and the Federal District. The three others - Amapa, Roraima and Amazonas – made marginal contributions to between-

state inequality; in fact, their contributions move above and below the line during the period of study. The geographic units that contributed to inequality "from below" are those with average wages below the national average (those appearing below the zero line in Figure 6-19): Rio Grande Sul, Tocantins, Rondonia, Mato Grosso Sul, Sergipe, Piaui, Espirito Santo, Mato Grosso, Alagoas, Rio Grande Norte, Maranhao, Paraiba, Para, Goias, Santa Catarina, Parana, Pernambuco, Ceara, Bahia and Minas Gerais. The geographic units that contributed the most to inequality "from below" were Minas Gerais, Bahia, Ceara, Pernambuco, Parana and Santa Catarina, in that order.

Two trends in pay inequality between the states emerge. During the first period, between 1996 and 2001, pay inequality was generally increasing, with a brief interruption between 1998 and 1999. Between 1996 and 1998, the increase was driven mainly by the increasing contribution of Sao Paulo. Inequality continued increasing in 1999, despite a reduction in Sao Paulo's contribution that year. That reduction was offset by increases in the contributions of two high paying states: the Federal District and Rio de Janeiro. Inequality levels decreased the following year, but the reduction was short-lived: inequality increased again from 2000 to 2001, explained this time mainly by the increasing contribution of Sao Paulo, but with accompanying increases in the contributions of Rio de Janeiro and the Federal District. Inequality levels began decreasing in 2001, returning to 1996 levels by the end of the period. This reduction in inequality levels is explained to a great extent by reductions in the relative well-being of Sao Paulo and Rio de Janeiro: their contributions decreased by 33 percent and 17

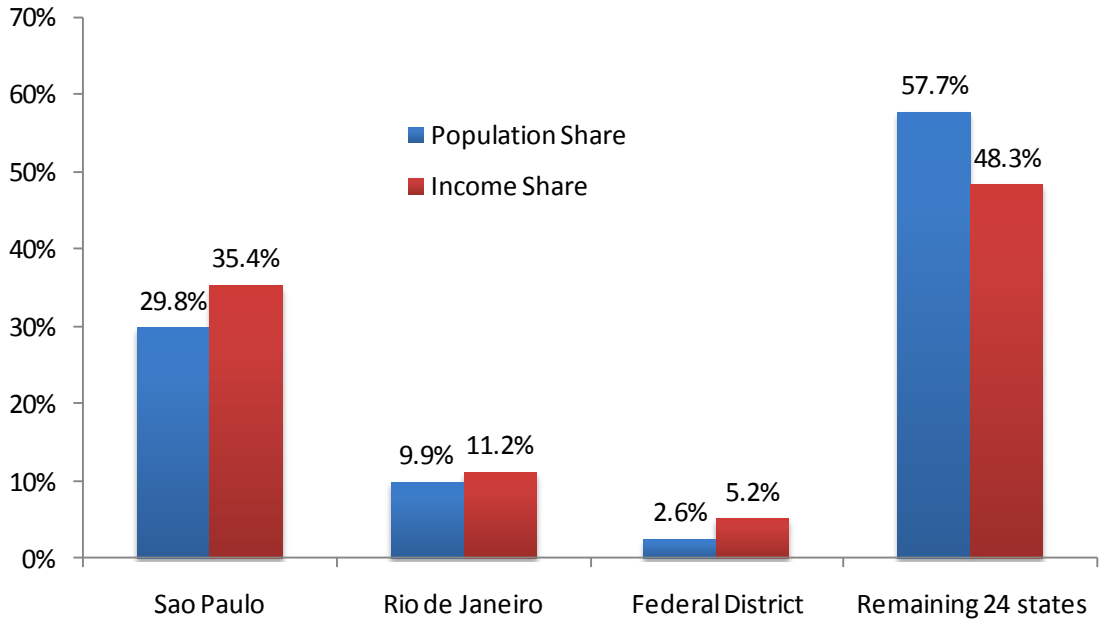
percent, respectively. At the same time, the contributions of the Federal District increased by 35 percent, including a noticeable jump in 2006.

Broadly, Sao Paulo plays the most important role in determining change in pay inequality between states in Brazil between 1996 and 2007 (see maps in Figures C-5 and C-6, Appendix C). Figure 6-19 shows that there are essentially three 'states' (as previously explained, the Federal District is not a state) with average wages above the average wage of the economy – high-pay states – that contributed to pay inequality from above during the period of study (1996-2007): Sao Paulo, the Federal District and Rio de Janeiro, in that order. Of these three geographic units, Sao Paulo made far and away the largest contribution to pay inequality from above across the period of study, but the contributions of Sao Paulo and the Federal District are moving in opposite directions: while that of Sao Paulo has diminished, that of the Federal District has grown.

High Pay States

As demonstrated by Figure 6-19, Sao Paulo, Rio de Janeiro and the Federal District (Brasilia) are significant drivers of pay inequality between states in Brazil. Three other states (Amapa, Roraima and Amazonas) have contributed to pay inequality from above in the period of study, but their contributions are small and they oscillate between being positive contributors and negative contributors. As such, they are omitted from this analysis.

Figure 6-20. Population and Income Shares of High Pay States, 2007



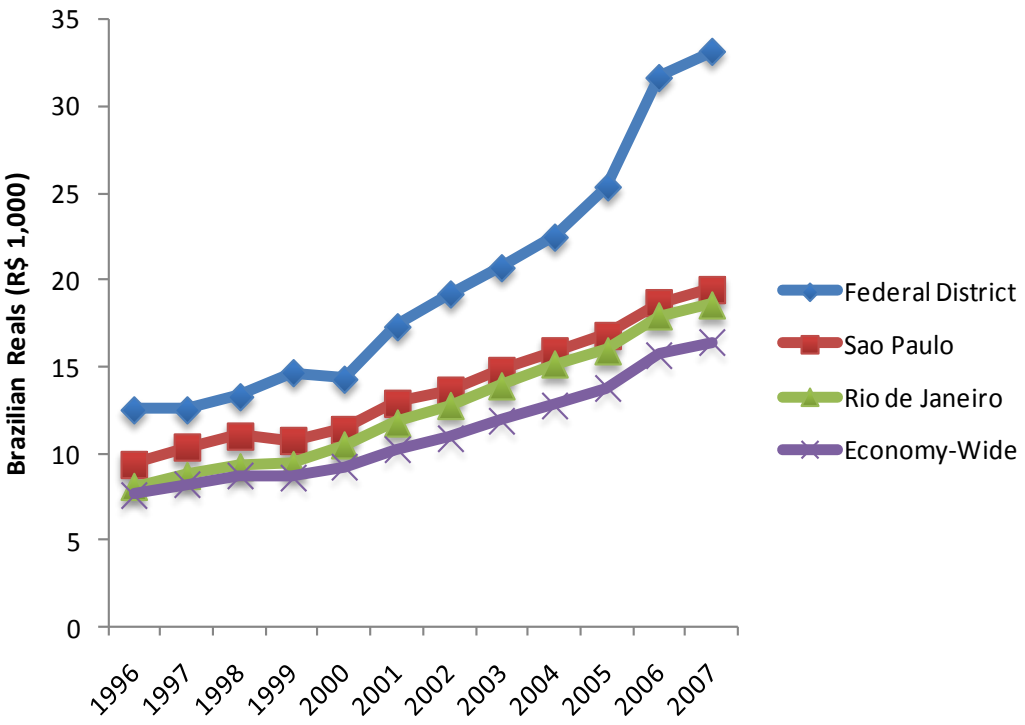
Source: Author's calculation based on IBGE data.

These two high pay states (Sao Paulo and Rio de Janeiro) and the Federal District (Brasilia) account for about 42 percent of the formally employed population, while taking in approximately 52 percent of wage income. As shown in Figure 6-20, Sao Paulo state, with Sao Paulo city at the heart of the country's financial and industrial economy, has a dominant role.

These two states and the Federal District provide examples of two different ways in which "high pay" regions make large contributions to the inequality between states – one by providing, on average, good wages to a large number of people (Sao Paulo and Rio de Janeiro), and the other by providing significantly above-average wages to a smaller group of people (Federal District). With only 2.6 percent of the country's formally-employed population in 2007, the

Federal District can only be an important contributor to inequality from above because of high wages. Figure 6-21 shows by how much average wages in the Federal District outpace not only the average wages in the overall economy, but also those of Sao Paulo and Rio de Janeiro.

Figure 6-21. Average Wages by State

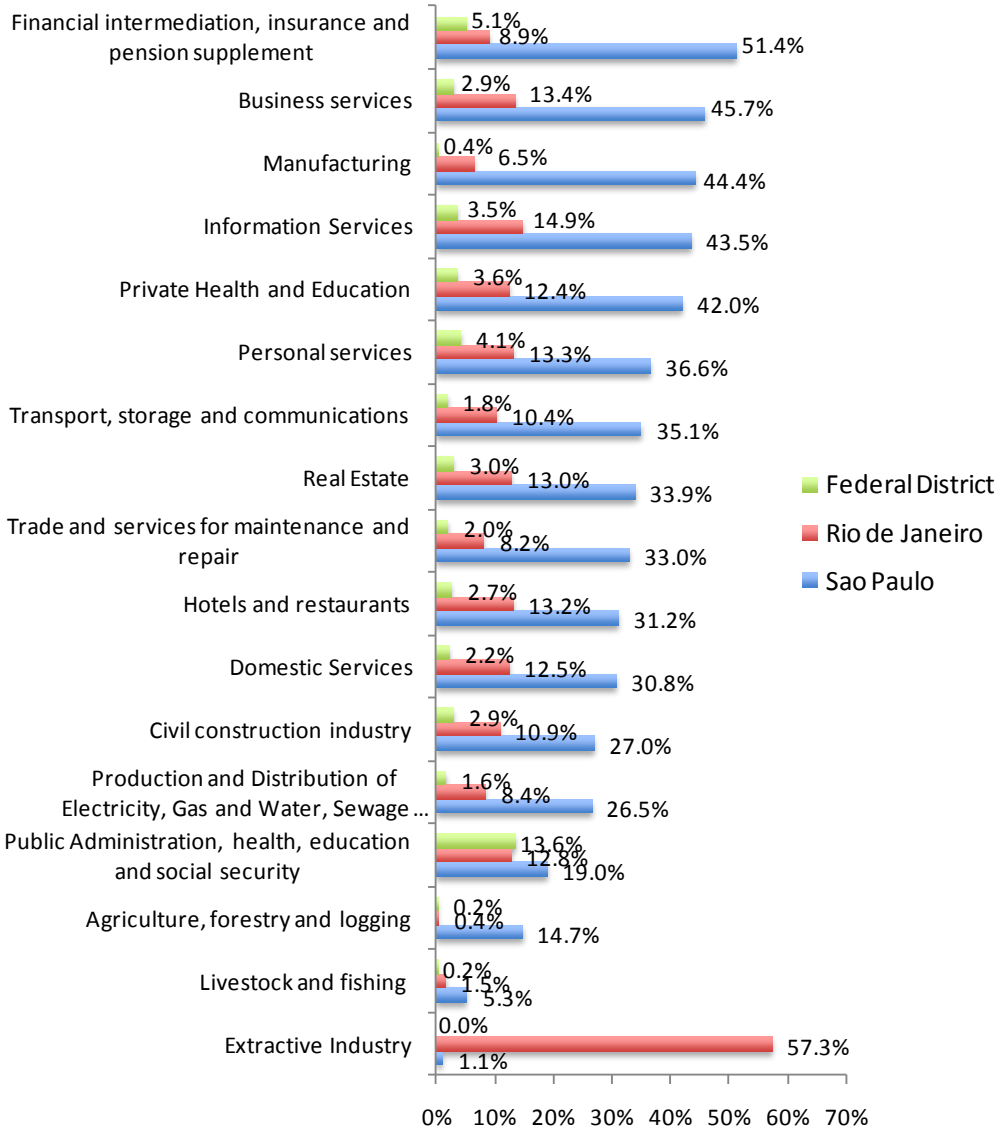


Source: Author's calculation based on CEMPRE data.

Sao Paulo is the richest and most populous state in Brazil, producing 33.9 percent of the country's GDP in 2007. Similarly, Rio de Janeiro is second in contributions to GDP among Brazilian states, with a little over 11 percent. Including the share of national GDP contributed by the Federal District (3.8 percent), these three states are responsible for just under 50 percent of Brazilian GDP (see Table C-1, Appendix C).

Sao Paulo's economy is diverse: it has a strong industrial base, as it is the center of the high-value manufacturing of everything from automobiles and airplanes to food products. Rio de Janeiro is known as the center of Brazil's extractive activities, a result of its geographic position as the port in closest proximity to Minas Gerais, the state that, historically, was the center of mining activity in Brazil. Currently, exports of petroleum and fuels are more important to the Rio de Janeiro economy than metals, but the extractive focus remains: 57 percent of the portion of Brazil's GDP derived from extractive industries comes from Rio de Janeiro (see Figure 6-22). Strong service sectors have developed in both cities in support of these economic activities: the GDP of Sao Paulo is split almost evenly between service activities and industry (51/47). Among these service activities, those in the financial sector are of key importance due to high wages in this sector. Sao Paulo's financial services sector employs about 40 percent of those who work in finance in Brazil (see Table C-2, Appendix C), and produces about 50 percent of the GDP produced in the Brazilian financial sector as shown in Figure 6-22. This provides context to the average wages provided in Figure 6-21: while the overall average wage in Sao Paulo is much closer to the national average than that of the Federal District, wage inequality within Sao Paulo is high. The average is a function of a few people earning quite a lot, and many others earning salaries that are average or below.

Figure 6-22. Share of Brazilian Gross Value Added at Basic Prices by Economic Activity, 2007



Source: Author's calculation based on CEMPRE data.

The Federal District is an altogether different phenomenon: designed and developed for the sole purpose of functioning as the country's political center, and located near the center of the country for this purpose, Brasilia was designed

in the late 1950s and began to serve as the capital of Brazil in 1960 (prior to this time, the capital was in Rio de Janeiro). With the civil services at the core of the cities' purpose, fully 40 percent of the formally employed in the Federal District work in the government (see Figure C-7, Appendix C).

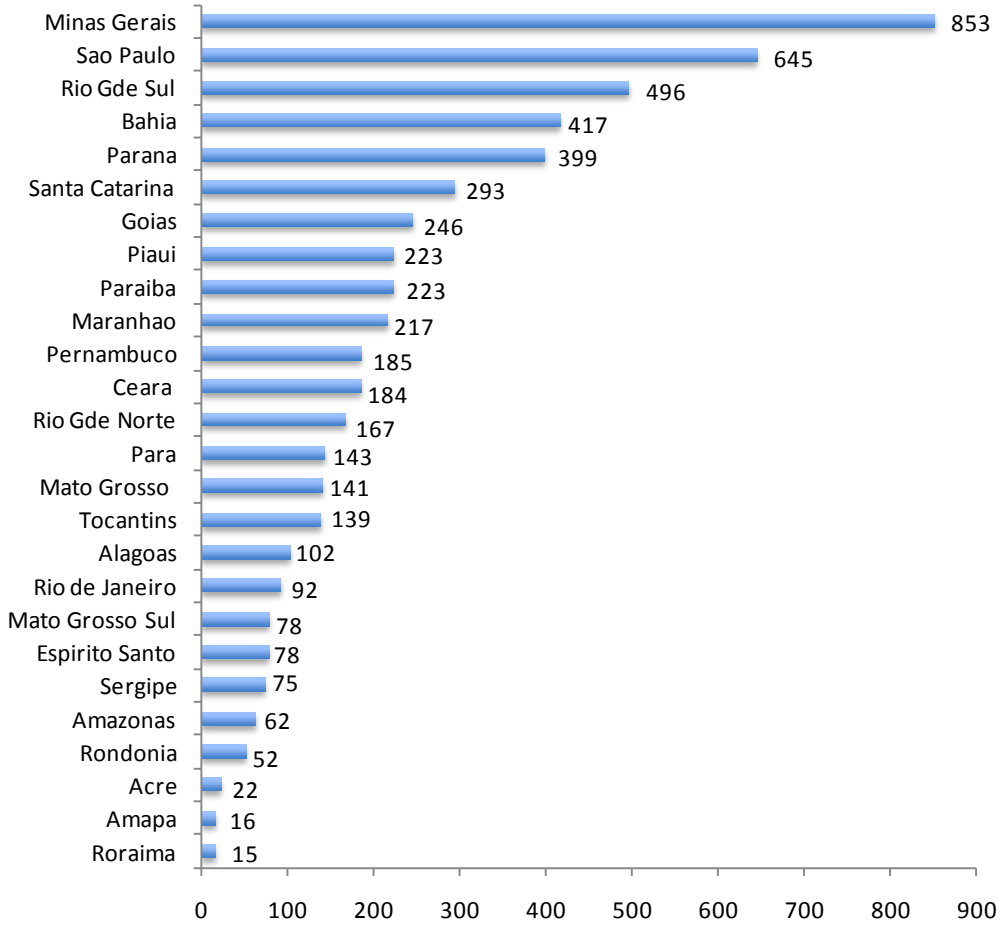
Preliminary Conclusions: Between and Within State Inequality

In Brazil, the states with the highest levels of inequality are also the wealthiest states. This result is quite different from results obtained by Galbraith and Garcilazo (2008) in studying European inequality, where they found that wealthy regions (those contributing to inequality from above) have strikingly lower levels of inequality within them than those with below-average wages.

INEQUALITY AT THE MUNICIPAL LEVEL

As of 2007, Brazil's 27 states were divided into 5,564 municipalities. These municipalities are distributed across the states as shown in Figure 6-23.

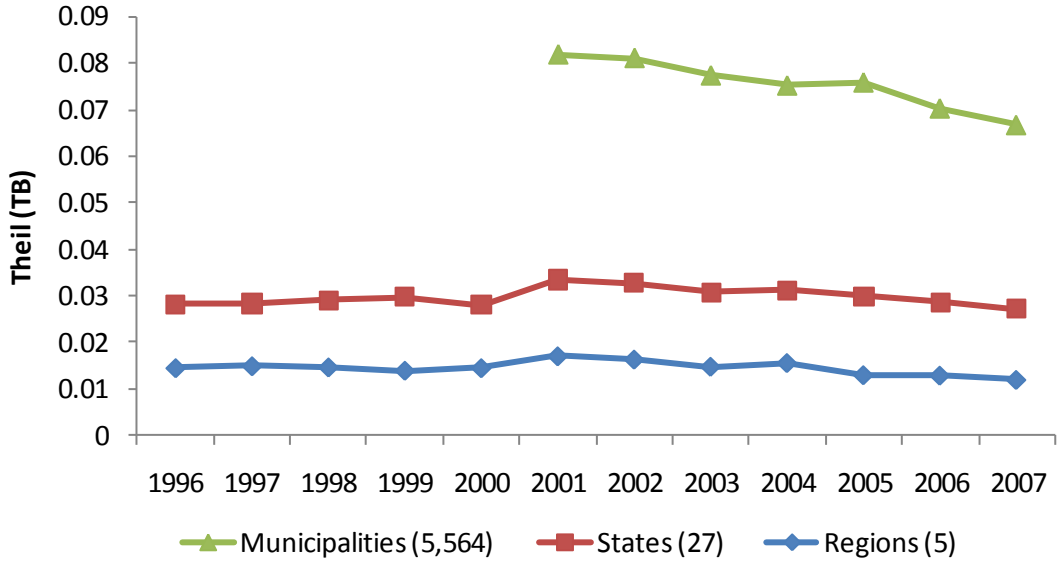
Figure 6-23. Number of Brazilian Municipalities by State



Source: IBGE (2009).

Inequality between municipalities is calculated in the same fashion as calculated between regions or between states; however, because data are only available at the municipal level beginning in 2001, the trend is presented beginning in that year. As Figure 6-24 shows, the trend from 2001 to 2007 is decreasing.

Figure 6-24. Municipal, State, and Regional Inequality



Source: Author's calculations based on CEMPRE data.

Disaggregation to the municipal level significantly increases the amount of information on which to base an estimate of inequality as compared with measurement at the state or regional level: more of the existing inequality can be measured. Figure 6-24 confirms that the trends observed at higher levels of aggregation are the same as those that are observed at lower levels of aggregation: as discussed in previous sections, both state and regional inequality decreased from 2001 to the end of the period.

IBGE (2009) presents a detailed analysis of the concentration of income generated by Brazilian municipalities. In this analysis, IBGE computes a gini coefficient to estimate inequality between municipalities, using the gross domestic product by municipality to estimate a gini coefficient of 0.86, which provides evidence of significant concentration of the national income in a limited

number of municipalities. A similar concentration appears in applying Theil's T statistic to the CEMPRE data at the municipal level.

Table 6-1 presents the Theil contributions from above of the three municipalities making the largest contributions from above, along with those municipalities' share of Brazilian GDP and their population shares.

Table 6-1. 2007 Shares of Theil Contributions from Above, Contributions to Brazilian GDP, and Population Shares for the Top 3 Municipalities

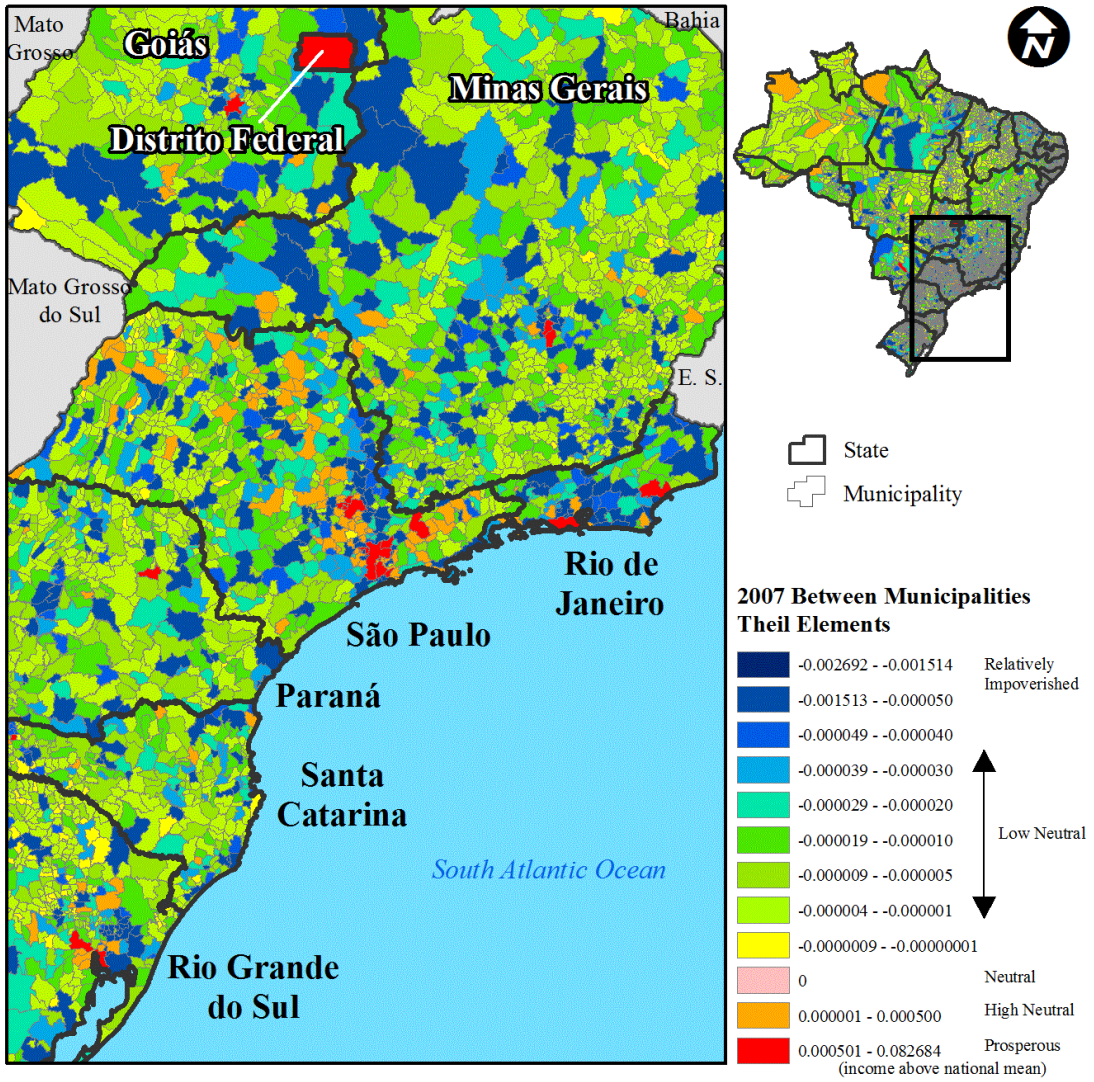
Municipality/ State	**Share of Contributions to Theil's T from Above**	**GDP**	**Population**
São Paulo/SP	31.4	12	5.9
Brasília/DF	20.1	3.8	1.3
Rio de Janeiro/RJ	11.6	5.2	3.3
Total	**63.1**	**21.0**	**10.5**

Sources: IBGE and author's calculations based on CEMPRE data.

The three municipalities in Table 6-1 are responsible for 63 percent of the contributions from above to Theil's T statistic. They produce 21 percent of Brazilian GDP, despite having only 10.5 percent of the population. Given that there are 5,564 municipalities in Brazil, the concentration of income in just three municipalities demonstrates a vast inequality between municipalities in Brazil.

The geographic distribution of this unequal distribution is provided for a selection of states in Figure 6-25. The map focuses on the few states (Sao Paulo, Rio de Janeiro, Federal District, Minas Gerais, Rio Grande Do Sul and Parana) with the largest concentration of prosperous (high pay) municipalities are located.

Figure 6-25. Contributions to Brazilian Municipal Inequality (2007)



Source: Author's calculation based on CEMPRE data.

An interesting feature of Brazilian inequality, when shown at this level of detail, is the proximity between the most prosperous municipalities (those making large contributions from above) and the least prosperous (those making large contributions from below). While Sao Paulo has a number of municipalities surrounding it that are high pay, the same cannot be said for Rio de Janeiro or

the Federal District, both of which are in direct proximity to municipalities that make some of the largest contributions from below in the country.

CONCLUSIONS

In this section, inequality between and within a number of different groupings has been presented. In all cases, inequality in Brazil was less in 2007 than at the beginning of the period of study, in 1996. For both the inequality between economic sectors and the overall geographic inequality (the sum of between-group and within-group inequality), four general sub-trends were observed. From 1996 to 1999, inequality was at its highest, and relatively stable. Inequality fell between 1999 and 2001, after which another period of stability set in, until about 2005. From 2005 to 2007, inequality levels again increased.

Trends in inequality between Brazilian geographic areas were slightly different. At both the regional and state level, generally increasing inequality between geographic areas is observed from 1996 until 2001, though with a slight reduction between 1999 and 2000. At all three levels (regional, state, and municipal), inequality between geographic areas decreased from 2001 to 2007.

The trends are driven by variation in the performance of certain economic sectors and certain key regions. What is clear from the inter-sectoral analysis is that the changes in inequality are driven by the relative performance of three key sectors: finance, civil service, and, to a lesser extent, mining (mostly in the last two years).

At the geographic level, it is also possible to identify how the changing contributions of two states – Sao Paulo and Rio de Janeiro – and the Federal District are responsible for much of the changes in inequality during the period

of study. What stand out at the state level are the diminishing contribution of Sao Paulo and, conversely, the increasing contributions of the Federal District and Rio de Janeiro. These same observations explain the results obtained at the regional level: contributions from the Center-West region increase, even as contributions from the Southeast decrease. Analysis of geographic inequality at the municipal level demonstrated how just three municipalities (Sao Paulo, the Federal District, and Rio de Janeiro) within these two regions and three states, are responsible for a significant portion of Brazilian inequality.

References

Barros, Ricardo, Mirela De Carvalho, Samuel Franco, and Rosane Mendonça. 2010a. "Determinantes da Queda na Desigualdade de Renda no Brasil " Working Paper No. 1460, Instituto de Pesquisa Econômica Aplicada (IPEA), Rio de Janeiro.

—. 2010b. "Markets, the State and the Dynamics of Inequality: The Case of Brazil." Discussion Paper, United Nations Development Programme, Bureau for Development Policy, Poverty Group.

Barros, Ricardo, Ricardo Henriques, and Rosane Mendonça. 2001. "A Estabilidade Inaceitável: Desigualdade e Pobreza no Brasil " Working Paper No. 800, Instituto de Pesquisa Econômica Aplicada (IPEA), Rio de Janeiro.

Bourguignon, François, Francisco H. G. Ferreira, and Nora Lustig. 2005. *The Microeconomics of Income Distribution Dynamics in East Asia and Latin America*, Washington, DC [New York]: World Bank; Oxford University Press.

Ferreira, Francisco H. G. and Ricardo Barros. 1999. "The Slippery Slope: Explaining the Increase in Extreme Poverty in Urban Brazil, 1976-1996." *The Brazilian Review of Econometrics* 19(2):211-296.

—. 2000. "Education and Income Distribution in Urban Brazil, 1976-1996." *CEPAL Review* 71:41-61.

Galbraith, James K. and Enrique Garcilazo. 2008. "Inequalities, Employment and Income Convergence in Europe: Evidence from Regional Data." UTIP Working Paper No. 52, The University of Texas at Austin, Austin, Texas.

Gasparini, Leonardo, Guillermo Cruces, and Leopoldo Tornarolli. 2008. "Is Income Inequality in Latin America Falling?" in *XLIII Reunión Anual de la Asociación Argentina de Economía Política*. Córdoba, Argentina.

IBGE. 2009. "Produto Interno Bruto dos Municípios 2003-2007." Contas Nacionais No. 30, Instituto Brasileiro de Geografia e Estatística, Rio de Janeiro.

López-Calva, Luis Felipe and Nora Lustig. 2010. "Declining Inequality in Latin America A Decade of Progress?": Brookings Institution Press and the United Nations Development Programme.

Székely, Miguel and Marianne Hilgert. 1999. "What's Behind the Inequality We Measure: an Investigation Using Latin American Data." The Inter-American Development Bank (IDB), Washington, D.C.

Chapter 7: Chile

This chapter begins with an overview of the evolution of income inequality in Chile over the past 20 years presenting an inequality index (the gini coefficient), the ratio of mean income of the top (richest) quintile/decile to that of the bottom (poorest) quintile/decile and the share of total income by decile. Secondly, two sections on the use of Theil's T statistic to identify trends in inequality are presented. The first section focuses on the inequality between economic sectors, while the following section discusses trends in inter-regional inequality. Finally, preliminary conclusions are presented.

EVOLUTION OF INCOME INEQUALITY IN CHILE AND ITS DETERMINANTS

In the last 20 years - the period corresponding to the recovery of democratic rule in Chile - the performance of the Chilean economy has been characterized as consisting of rapid economic growth with an impressive reduction in poverty,[100] but with persistent high levels of income inequality. It is also well-documented in the literature that there was a structural rise in Chilean income inequality after 1974 or that the rise in inequality in Chile that began in 1974 was a structural phenomenon (Larrañaga 2001).

[100] According to the results provided by the CASEN surveys, between 1990 and 2009 there was a significant reduction in poverty. In these 19 years, non-indigent poverty decreased from 25.6 percent of the population to 11.4 percent and extreme poverty (indigence) fell from 13 percent of the population to 3.7 percent. Overall, the portion of the population living in poverty declined from 38.6 percent to 15.1 percent. Nevertheless, the 2009 CASEN revealed an increase in poverty for the first time since 1990: in 2009, about 15.1 percent of the population found itself in poverty, as compared with only 13.7 percent in 2006. The increase is also observed in the incidence of extreme poverty, which rose half a percentage point from 3.2 to 3.7 percent in this period (see Figure A-1 of the Appendix).

However, since the recovery of democratic rule, two clear trends are identified in the academic literature, one between 1990 and 2000 and another from 2000 to the present.

High - and relatively stable - levels of inequality were present in Chile in the 1990s (Contreras, Larrañaga *et al.* 2001; Larrañaga and Valenzuela 2007; Solimano and Torche 2007),[101] but the literature also agrees that there has been a significant decrease in inequality in Chile in the 2000s (Larrañaga 2009; (Gasparini, Cruces *et al.* 2008).

If we take into account the latest results shown by the Socio-Economic Characterization Survey (CASEN) implemented by the Chilean Ministry of Planning and Cooperation (MIDEPLAN) in 2009 three visible trends emerge between 1990 and 2009. Both autonomous and monetary income inequality[102] rose in Chile during the 1990s and declined in the 2000s, at least until 2009: the preliminary results of the 2009 CASEN[103] survey were recently released, and

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[101] Solimano and Torche (2007) argue that income inequality underwent a small reduction in the period from 1987 to 2003, presenting as evidence that the gini coefficient fell from 0.577 in 1987 to 0.567 in 2003. However, in 2007 Larrañaga and Valenzuela concluded that the gini coefficient did not undergo any change during the democratic period; the coefficient was 0.56 in 1990 and 0.56 in 2003.

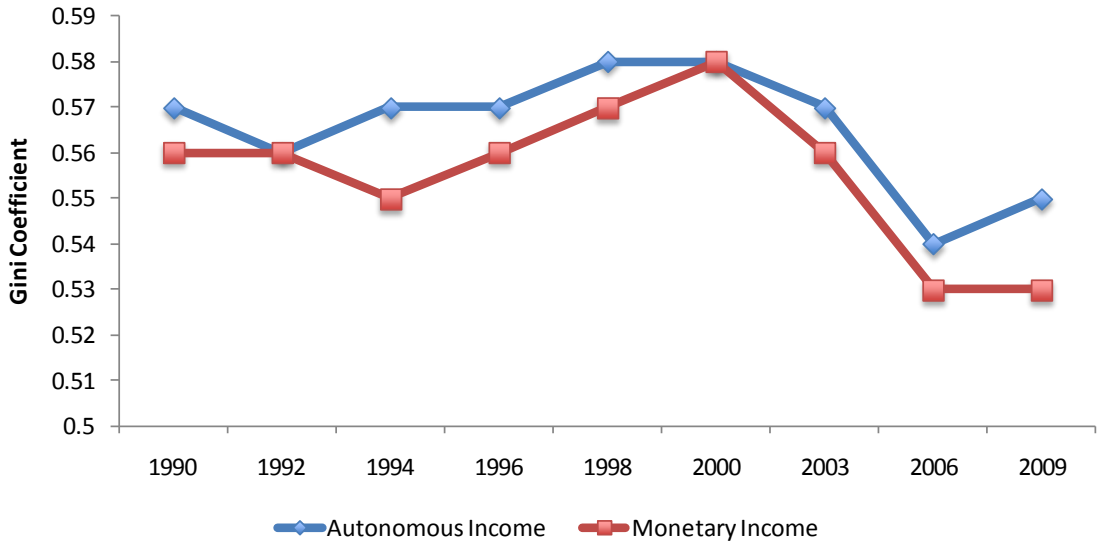
[102] Autonomous household income is defined as all the payments that a household receives as a result of the possession of factors of production. It includes wages and salaries, income from self-employment, self-produced goods by the household, rents, interest, pensions and retirements while monetary household income is defined as the sum of the autonomous income and direct monetary transfers (subsidies) in the form of assistance pensions (PASIS), severance pay, the single family subsidy (SUF), family allowances and the potable water subsidy (SAP) (MIDEPLAN 2010a, p. 2).

[103] The Socio-Economic Characterization Survey (CASEN) was implemented between November and December of 2009 with 71,460 Chilean households. The survey is nationally representative, with both urban and rural zones across all 15 regions of the country represented. It is a statistically significant sample of households, with a sampling error of 0.36 percent, considering maximum variance and a confidence level of 95 percent (MIDEPLAN 2010).

analysis of income distribution from this latest survey indicates that the trend has reversed.

Figure 7-1 shows the gini coefficient for Chile between 1990 and 2009, using autonomous and monetary household income as calculated using the results from the CASEN survey.

Figure 7-1. Gini Coefficient for Chile between 1990 and 2009



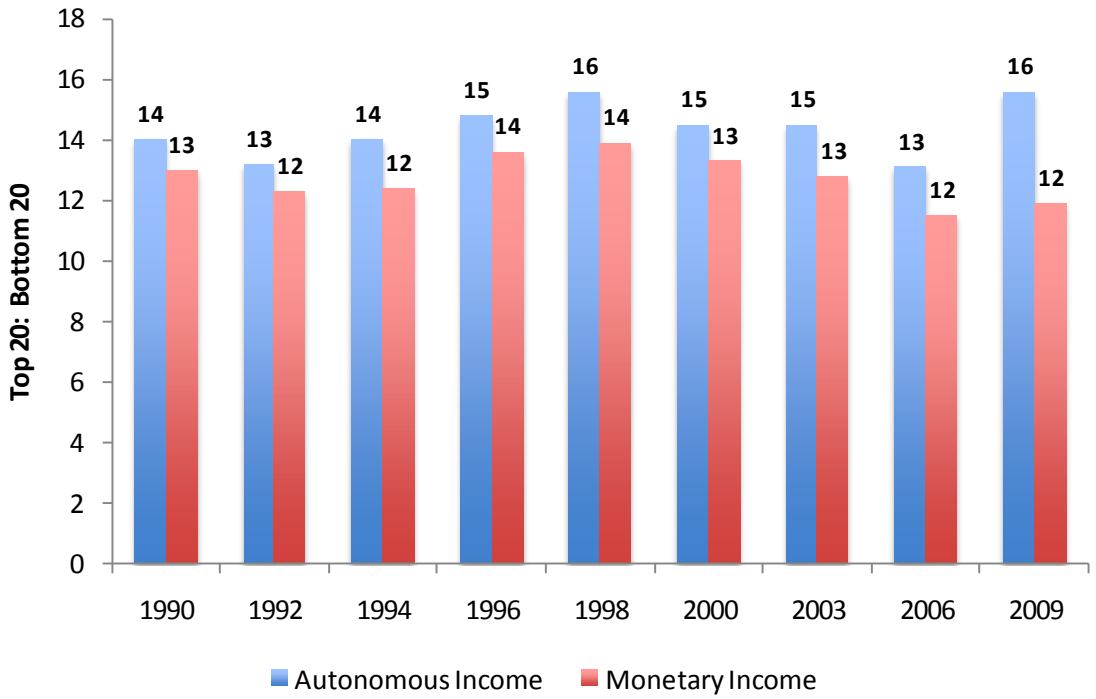
Source: Chilean Ministry of Planning and Cooperation (MIDEPLAN), CASEN respective years.

Gini coefficients in the last 20 years have ranged between 0.53 and 0.58 considering autonomous or monetary income. As can be seen in Figure 7-1, income inequality had been gradually increasing since the beginning of the 1990s (gini coefficient 0.56) until the year 2000 (gini coefficient 0.58), at which point inequality (as measured with both autonomous and monetary income) started decreasing: the gini coefficient fell to 0.54 in 2006, autonomous income). A reversal in the decreasing trend is observed in 2009, as there is a slight rise in the value of the gini coefficient (to 0.55 autonomous income). However, it is difficult

to say at this stage whether this is indicative of a new, rising trend that will be significant and sustained in time, or if it simply represents a temporary setback due to economic conditions after being hit by the US crisis.

To illustrate another aspect of Chilean income distribution quintiles are presented below.[104]

Figure 7-2. Chilean Income Distribution Quintiles, 1990 - 2009



Source: Chilean Ministry of Planning and Cooperation (MIDEPLAN), CASEN respective years.

When considering autonomous income Figure 7-2 shows that in 1990 the ratio between the incomes of the richest 20 percent (quintile V) and the poorest 20 percent of the Chilean population (quintile I) was 14: the wealthiest 20 percent

[104] The 20/20 is the ratio of the earnings of the richest quintile (the top 20 percent) to that of the poorest quintile.

of Chileans earned 14 times what was earned by the poorest 20 percent. Between 1992 and 2006 this ratio oscillated between 13 and 15, reaching the highest value during the period of study in 2009, at 15.6 (a value also reached in 1998). However, when considering monetary household income (that which includes direct monetary transfers from the State to the most vulnerable households), the ratio between the incomes of the wealthiest 20 percent and the poorest 20 percent of the Chilean population has gone down to 11.9.

It is clear that the 20/20 ratio is lower when transfers from the State are included in the analysis, but even considering these transfers, the 20/20 ratio increased between 2006 and 2009, which represents a departure from the decreasing trend we observed between 2000 and 2003, and again between 2003 and 2006.

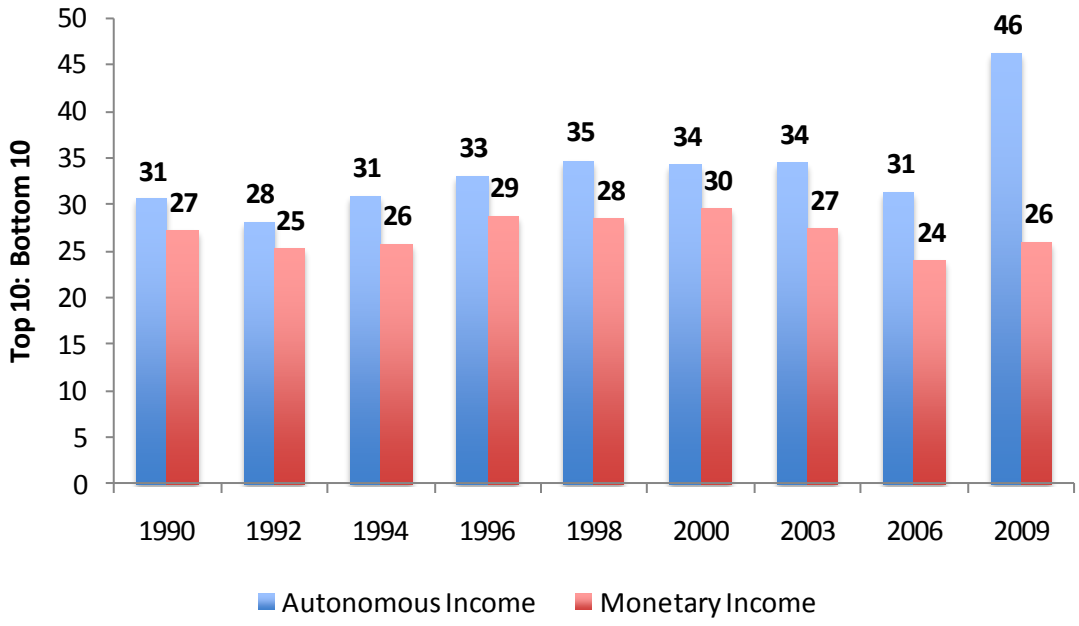
With a gini coefficient ranging between 0.53 and 0.58 across the period of study, the inequality measured in Chile is among the highest in Latin America.[105] As pointed out by Larrañaga (2009, p. 6) "Income inequality in Chile is high even by the standards of Latin America, the region with the highest levels of inequality in the world."

However, some authors argue that it appears that these high levels are linked to very high incomes in the top decile (Torche 2005; Bravo and Contreras 1999). According to Torche (2005, p. 423):

[105] The term 'measured' is used to denote that while Chile's gini coefficient is high, gini coefficients as calculated with survey data, may not be exactly comparable from country to country – each country implements its own survey, each of which has its own procedures and methodologies. A country's success at measuring income, particularly in the top decile, can greatly impact the gini coefficient calculated with those data.

The Chilean pattern may be described as "concentration at the top." Chile is highly unequal because the wealthiest segment of the society receives a very large portion of the national income, whereas the differences between the poor and middle-income sectors are much less pronounced, lower even than in some industrialized nations. Although inequality is by definition associated with concentration, the Chilean case is extreme, as compared with the industrialized world and even with other Latin American nations.

Figure 7-3. Chilean Income Distribution Deciles, 1990 - 2009[106]



Source: Chilean Ministry of Planning and Cooperation (MIDEPLAN), CASEN respective years.

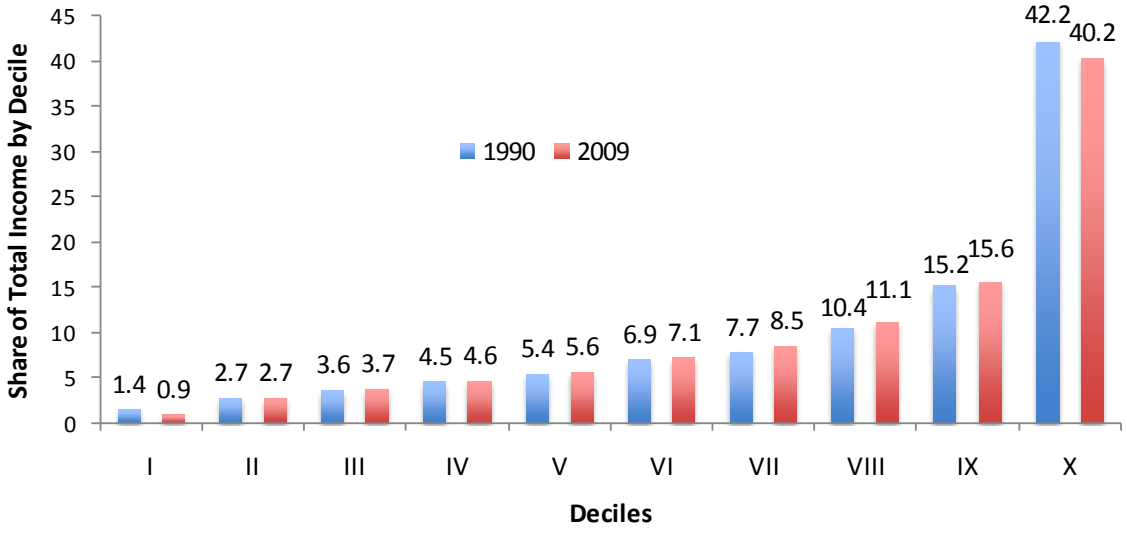
In 1990, Chilean households in the top income decile had autonomous incomes 30 times those of the lowest decile: this ratio peaked at 34.7 in 1998, after which it declined through 2006, only to jump significantly in 2009, at which point the top decile's incomes are estimated to be 46.2 times those of the poorest decile.

[106] The 10/10 is the ratio of the earnings of the richest decile (the top 10 percent) to that of the poorest decile.

The concentration of incomes in the extreme deciles is not fully captured in the data on which the gini coefficient is computed, as there is more weight and better measurement of the central part of the distribution than in either extreme.

When the relative shares of total autonomous income appropriated by each decile between 1990 and 2009 are considered, Figure 7-4 shows that there is little change in any decile's share; however, while the decrease in the share captured by the lowest decile may be small in gross terms, it represents a significant erosion in the autonomous earnings of that decile on a household basis.

Figure 7-4. Household autonomous income per capita by decile, 1990 - 2009.



Source: Chilean Ministry of Planning and Cooperation (MIDEPLAN), CASEN respective years.

The wealthiest segment of Chile's population receives a very large portion of the national income (40.2 percent), while income differences between the middle class and the poor are less pronounced. Figure 7-4 also shows that the share of household income of the top 10 percent of households decreased from

42.2 percent in 1990 to 40.2 percent by 2009, with the share of the bottom 10 percent decreasing also from 1.4 percent to 0.9 percent, demonstrating clearly that the lowest decile has benefited very little – at least in terms of their own, autonomous earnings - from the economic growth Chile experienced across the period of study.

Despite some improvements in its distribution of income, inequality levels continue to be a challenge for policy makers, particularly considering the successes Chile has had in terms of overall economic growth and poverty reduction. In the following section trends in pay inequality are presented according to the calculation of Theil's T statistic using data describing average wages by sector and geographic unit.

INTER-SECTORAL INEQUALITY IN CHILE

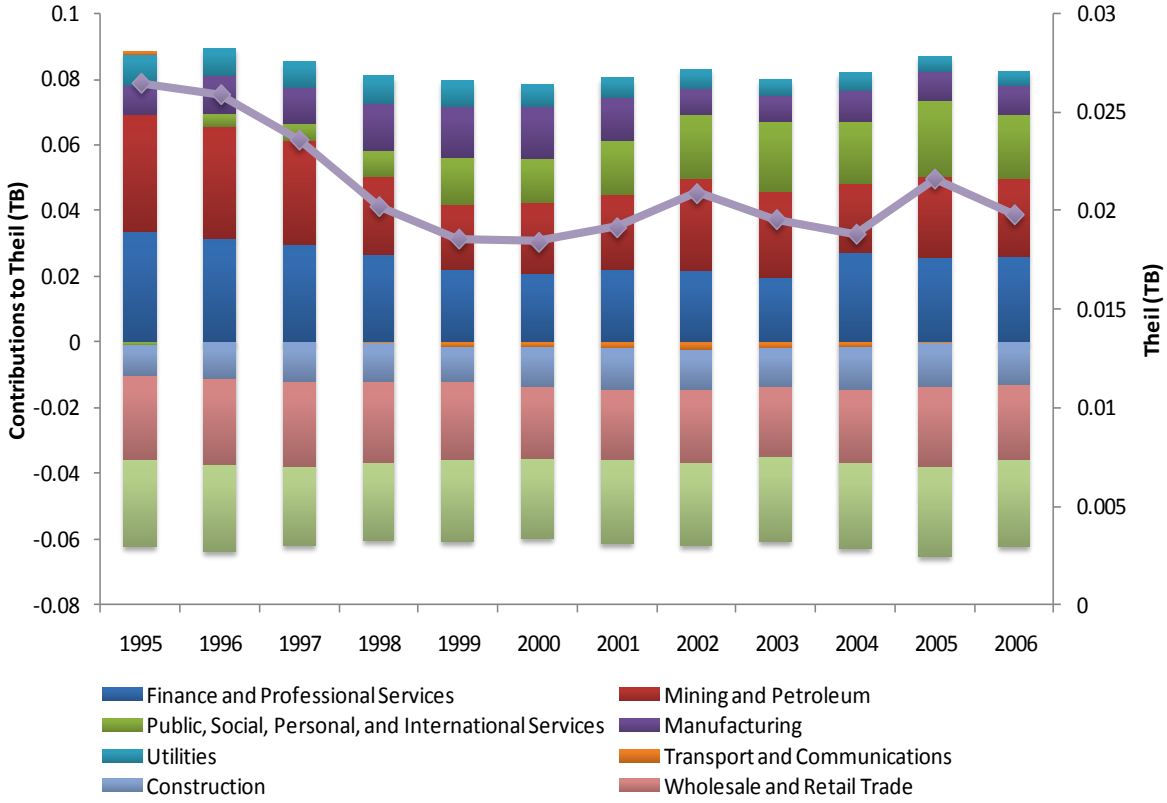
As mentioned in the data chapter, this dissertation makes use of administrative data from the Superintendency of Pension Fund Administrators (SAFP). When we refer in this chapter to the formally employed population in Chile, we are referring only to those active workers who make monthly contributions to the Chilean Pension System. Likewise, when we employ the word wages we refer to the worker's taxable income reported to the AFP (Pension Fund Administrator) of their choice.

The sectoral structure of the data from Chile changed between the second and third quarters of 2006. Specifically, there was an expansion in its industrial classification structure from 11 to 19 economic sectors. One reasonable approach for analyzing these data was to use one calculation, merging the trends using available cross-referencing between the two classifications to combine the data

before and after 2006. However, the original data included one sector named "unspecified activity and others," which was eliminated when the new scheme was implemented. The employees previously in this group were distributed among the new classifications making it impossible to merge the two classifications.[107] For this reason this dissertation presents two separate trends, one between 1995 and the first half of 2006, and the other from the second half of 2006 through the first half of 2010.

[107] Employees classified as "unspecified activity and other" represented 7 percent of the formally employed population and earned 7 percent of wages, on average, between 1995 and 2005.

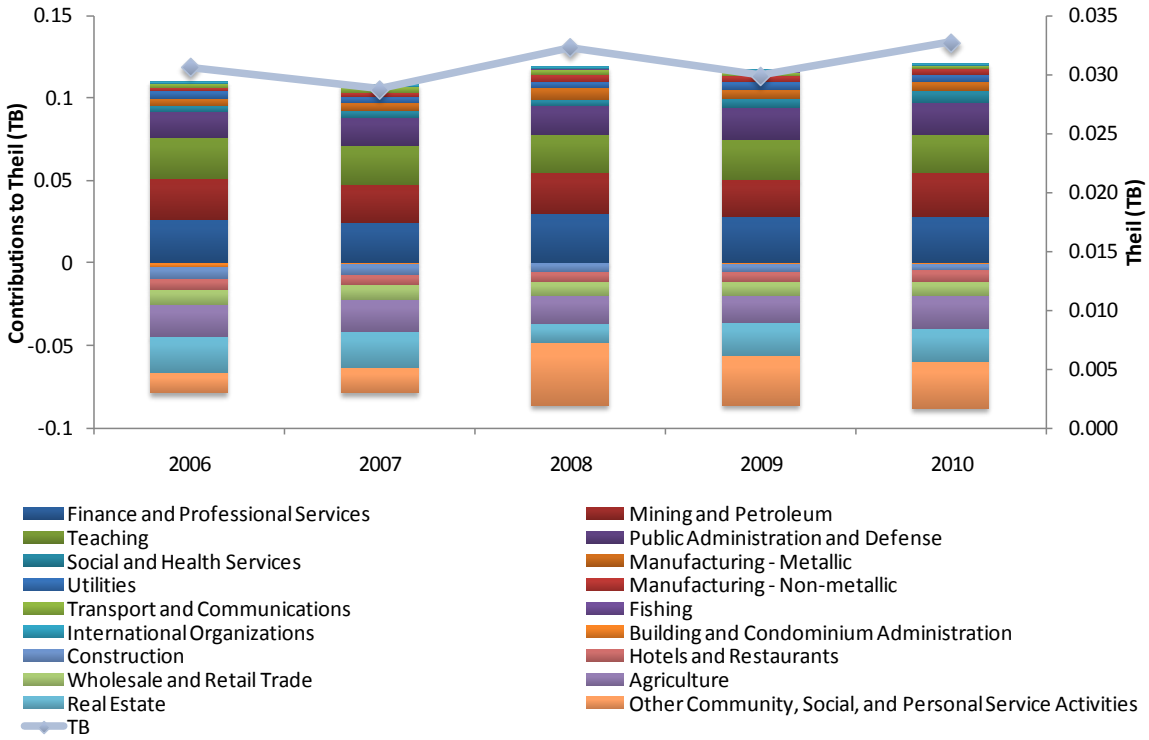
Figure 7-5. Pay Inequality by Economic Sector (1995-2006)[108]



Source: Author's calculations based on SAFP data.

[108] Of the 11 "sectors" for which data were available from 1995 to 2006, two sectors provide no information about the structure of the Chilean economy, and as such were excluded. These two sectors were "Unspecified Activity" and "Lacking Information."

Figure 7-6. Pay Inequality by Economic Sector (2006-2010)[109]



Source: Author's calculations based on SAFP data.

Stages

We can divide the reference period into two stages. During the first stage, from 1995 to 2000, sectoral inequality decreased significantly: we observe a 30 percent reduction in the calculated Theil's T statistic across this period, or about 6 percent per year. Since 2000, inequality has been relatively stable but increasing. From 2000 to the 2nd quarter of 2006 (original sector groupings), the observed inequality rose by 7 percent, and from the 3rd quarter of 2006 through

[109] As in the previous figure, data are excluded for the "Lacking Information" grouping (the "unspecified activity" grouping was eliminated from the newer data set).

the first half of 2010, inequality rose by 7 percent again. Across the period, inequality increased by about 1.5 percent per year.[110]

Contributions: High Pay Sectors

There are five "high pay" sectors in which average wages exceed the average wage in the overall economy across the first part of the period of study (1995-2006). These high-pay sectors contribute to overall pay inequality in Chile from above: Finance and Professional Services, Mining and Petroleum; Public, Social, Personal, and International Services; Manufacturing; Utilities (order biggest to smallest, last year 2006).

With the greater number of sectors included in the latter classification scheme (from including 9 sectors to 18), there are more "high pay" sectors. The high-pay sectors that contribute to overall pay inequality in Chile from above in the second period (2006-2010) are: Financial Intermediation; Mining and quarrying; Education; Public Administration and Defense; Health and Social Work; Manufacturing – Metallic; Utilities; Manufacturing - Non-metallic; Transport, Storage and Communications; Fishing; Extra-Territorial Organizations.

Similarities and Differences

Across the period of study, the two largest contributors to pay inequality in Chile are the same: Finance and Mining.

Similarly, the importance of the public sector can be observed across the period. The two highest-contributing sectors from above (finance and mining)

[110] Between 2000 and the first half of 2006, the increase was 1.5 percent per year. From the second half of 2006 through the first half of 2010, the increase was 1.7 percent per year.

are followed by Public, Social, Personal, and International Services in the first stage and by three sectors that can be characterized as divisions of that first-stage sector in the second stage: Education, then Public Administration and Defense, and then Health and Social Work.

The manufacturing and utilities sectors are contributors from above across the period of study. While Manufacturing is split in two in the second stage (Metallic and non-Metallic), its contributions are similar in both stages. In the first stage, the manufacturing sector's contribution follows that of Public, Social, Personal, and International Services in contributing from above. In the second stage, the metallic and non-metallic manufacturing sectors make similar, small contributions from above.

In the second stage there are two "high pay" sectors that were not present in the first stage: Fishing, and Extra-Territorial Organizations. In the first stage, fishing was part of the agriculture sector. Because fishing represented a relatively small portion of the economic activity then characterized as agriculture, the sector was a low wage sector. The Extra-Territorial Organizations sector presumably consists primarily of employment previously classified as Public, Social, Personal, and International Services, which was also a high-pay sector in the first stage.

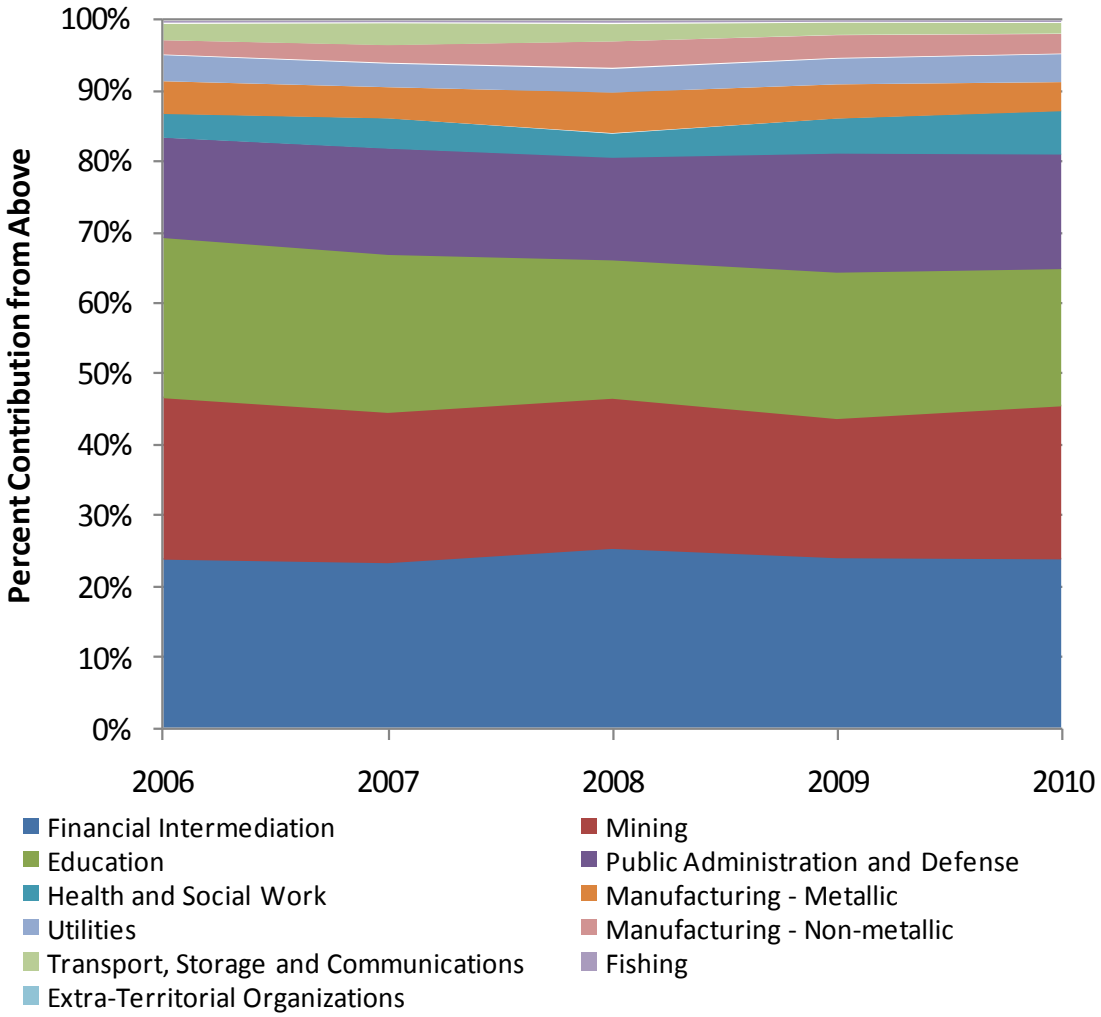
With one minor exception, the high pay sectors are high pay sectors, and low pay sectors are low pay across the period of study. The only sector that moved from low pay to high pay in the period of study was the Transport, Storage and Communications sector, which appears as "low pay" in all but the first year of the first stage. Its relatively small contributions to inequality reflect

that its wages hovered just below the national average in the first stage, such that a minor shift flips this sector into the "high pay" category for the entirety of the second stage. Its move from 'below the line' to 'above the line' does not suggest any significant change in its relative position.

Analysis of contributions from above

To understand the role of certain sectors in contributing to inequality, it is instructive to divide the economy into those that contribute from above and those that contribute from below. This allows for more absolute comparisons between the roles of sectors, as explained in the methods section. For Chile, due to data constraints associated with the greater disaggregation of economic sectors beginning in the second half of 2006, the analysis is presented for the latter portion of the period only to avoid confusion, as the difference between the relative contributions of any sector before or after the change is at least partially explained, or confounded, by the different number of sectors.

Figure 7-7. Percent contribution from above (2006-2010)



Source: Author's calculations based on SAFP data.

All the sectors in Figure 7-7 contributed to inter-sectoral pay inequality from above; however, two sectors - finance and mining - stand out as being major contributors to overall pay inequality in Chile between 2006 and 2010. These two sectors made about 45 percent of contributions from above. The contributions from above are quite stable: four sectors (finance, mining, education, and public administration) made between 81 and 83 percent of the

contributions to overall pay inequality from above during this period. As will be seen in the following section on relative wages, the role of two of these sectors – finance and mining – is primarily due to an income effect, while the role of the two other sectors – education and public administration – is more due to a population effect.

Contributions: Low Pay Sectors

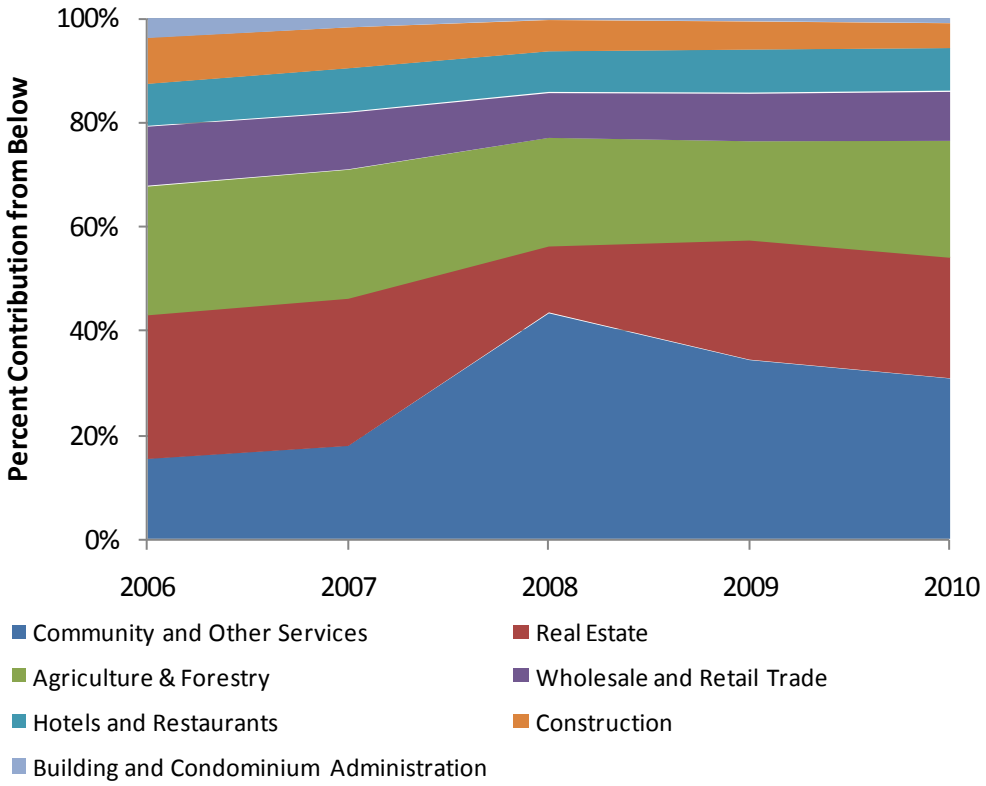
The sectors that contributed to inequality "from below" appear below the zero line in Figures 7-5 and 7-6:

Ordered by the size of their contributions between 2006 and 2010, the sectors of the Chilean economy that contribute to inequality from below are Other Community, Social, and Personal Service Activities; Real estate, renting and business activities; Agriculture, hunting and forestry; Wholesale and Retail Trade; Hotels and Restaurants; Construction; and Building and Condominium Administration. The sectors that make the largest contributions from below employ a significant share of the population employed, but workers in these sectors manage to take home a relatively small portion of the national income. Those sectors making smaller contributions either employ relatively few people, have average salaries that are closer to the economy-wide average, or both.

Analysis of contributions from below

As with the percent contributions from above, percent contributions from below are presented for the latter part of the period of study in Figure 7-8.

Figure 7-8. Percent contribution from below (2006-2010)



Source: Author's calculations based on SAFP data.

Sectors contributing to inequality from below are mostly stable, as shown in Figure 8, with two basic exceptions: the Other Community, Social, and Personal Services sector and the Real Estate, Renting and Business Activities sector. The former delivers a large increase in its relative contribution to inequality between 2007 and 2008, which is followed by decreases in that sector's contributions for the next two years. This trend is largely offset by an accompanying decrease, then increases, in the contributions of the real estate sector for those same years (2007-2008, 2008-2010).

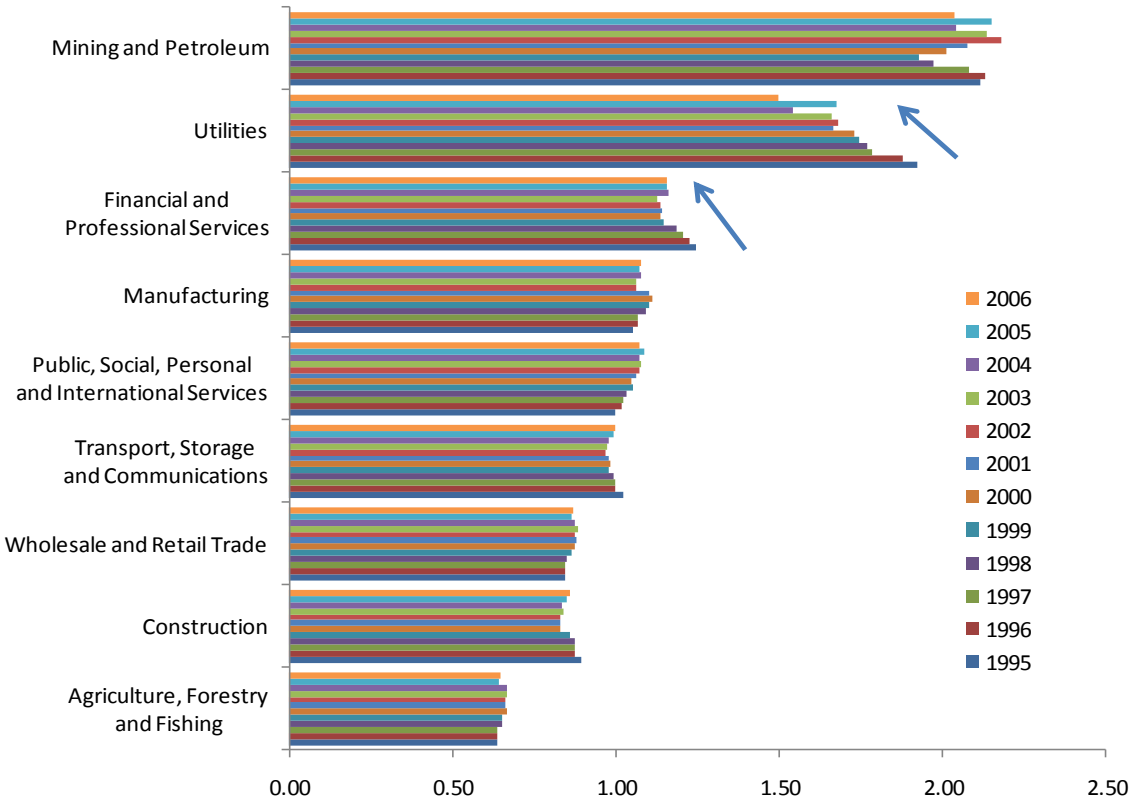
Relative Wages and Employment Levels

Two factors underlie the estimates of inequality between sectors in Chile: relative wages earned in each sector, and the relative population employed in these sectors.

Relative Wages

Figure 7-9 presents relative average wages (the ratio of a sector's average wage to the average wage in the economy) in each of the economic sectors for the entire period of study.

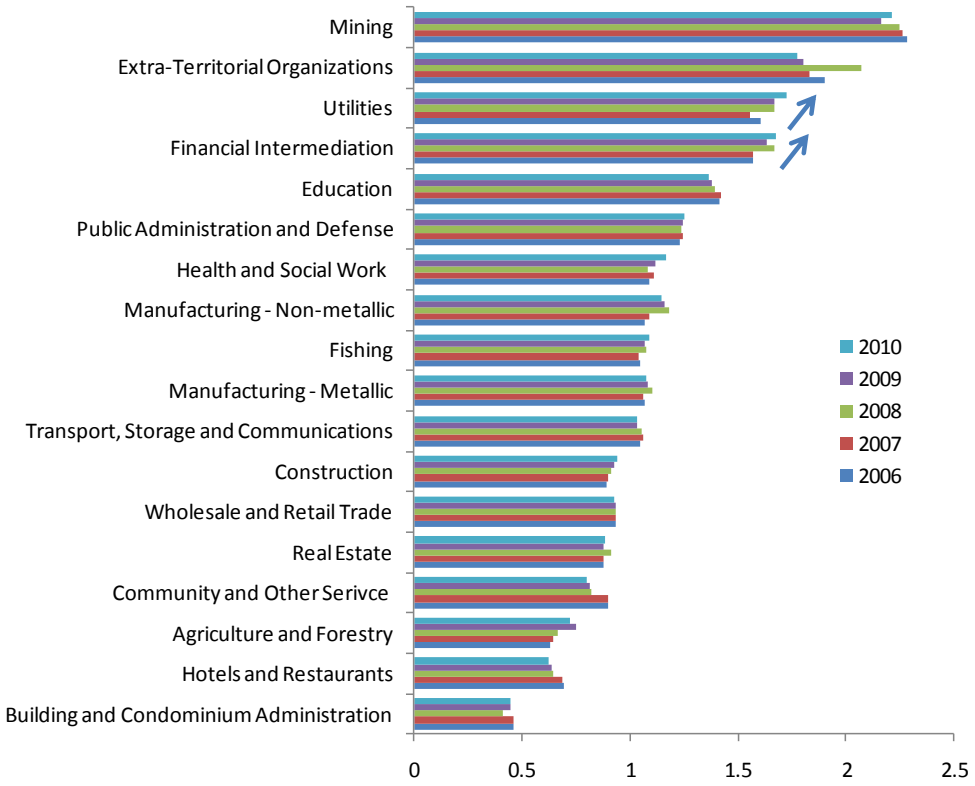
Figure 7-9. Relative Average Wages (1995-2006)



Source: Author's calculations based on SAFP data.

Arrows drawn on Figure 7-9 indicate key changes: reductions in relative wages in the Utilities and Financial and Professional Services sectors. Given their status as 2 of the 3 highest relative wage sectors in Chile, these reductions explain much of the decrease in inequality between sectors shown in Figure 7-5. Figure 7-10 shows the opposite trend with these two sectors: as the arrows indicate, relative wages in those two sectors grew. However, competing trends are observed in the other high pay sectors – slight decreases in the Mining sector and the Education sector – that counter-balance these increases. Inter-sectoral inequality in this period bounced up and down but did not change much overall.

Figure 7-10. Relative Average Wages (2006-2010)



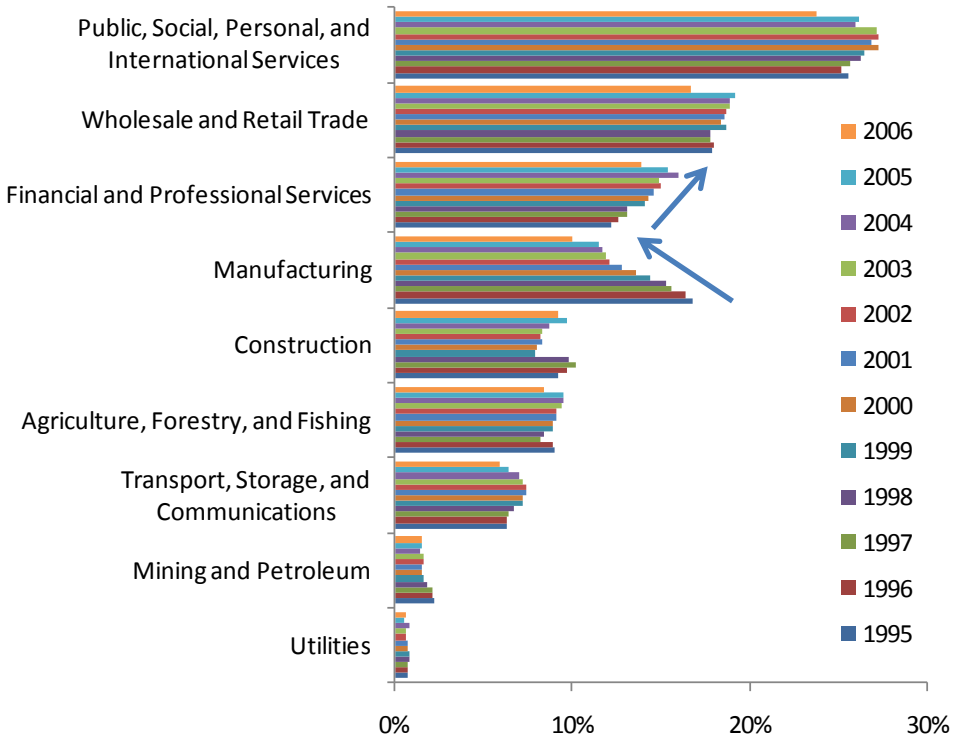
Source: Author's calculations based on SAFP data.

Figures 7-9 and 7-10 show high volatility in the relative wages earned in the high pay sectors, while for the most part relative wages in the lower-wage sectors do not change much.

As can be seen in Figure 7-9, there were five high pay sectors in Chile: Finance and Professional Services; Mining and Petroleum; Public, Social, Personal, and International Services; Manufacturing; and Utilities (ordered from largest to smallest in 2006). Wages earned in these five sectors are above the overall average wage in the economy (relative wages are greater than 1.0). Similarly, these same five sectors appear in Figure 7-10 as the five highest-paid sectors, although in a different order than their Theil contributions (Figure 7-6), which also take into account employment shares. The highest relative average wages are in the mining sector (second in terms of contributions to Theil's T), followed by utilities (last in terms of contributions), and then by finance (first in contributions to Theil's T).

Employment share

Figure 7-11. Employment Shares (1995-2006)

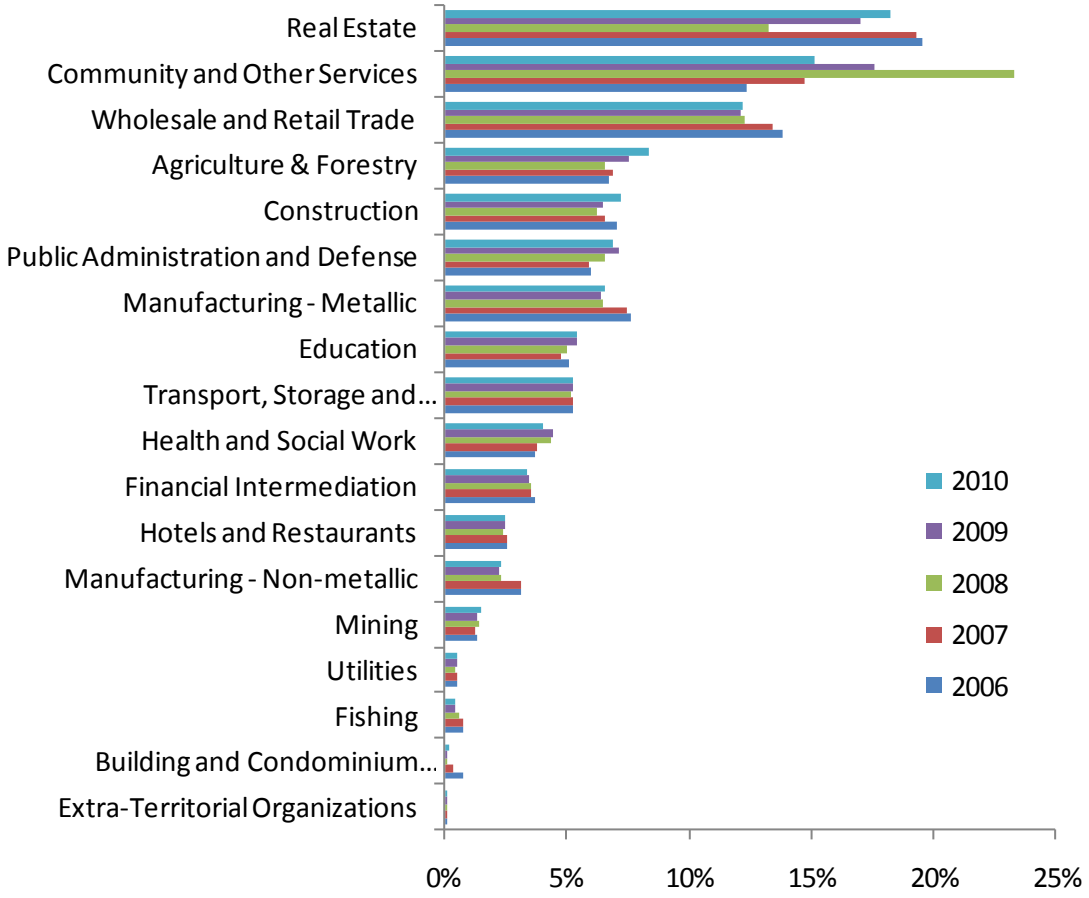


Source: Author's calculations based on SAFP data.

According to the data published by the SAFP, the economic sectors to which contributors to the social security system pertain are concentrated in four areas of economic activity: Public, Social, Personal, and International Services; Wholesale and Retail Trade; Finance and Professional Services; and, Manufacturing. Across the first stage, more than 70 percent of contributing workers were employed in these four sectors. By itself, The Public, Social, Personal, and International Services sector employs 25 percent of the employed population. This fact is largely responsible for its emerging importance in the first stage. Two opposing trends stand out: a steady decline in the share of

workers employed in the manufacturing sector, from 17 percent down to 10 percent, and an offsetting increase in employment in the financial sector.[111]

Figure 7-12. Employment Shares (2006-2010)



Source: Author's calculations based on SAFP data.

[111] In absolute terms, employment in the manufacturing sector grew, but by only 6 percent, from 300,000 to 315,000.

Relative Wages and Employment Shares

Taken together, the population and employment shares of each sector explain the sector's contributions to Theil's T statistic across the period of study. Whereas the highest wages were observed to be in mining and utilities (Figure 7-9), Figure 7-11 shows that only 1 percent of the population is employed in the utilities sector and 2 percent in mining, while 15 percent of the employed population works in finance and professional services (first stage). Thus, the financial and professional services sector makes the largest contribution from above, while the contribution of the mining and utilities sectors are smaller.[112]

Perhaps the most interesting observation to be made from the graphs of relative wages and employment shares is the relative instability of wages in the two of the highest-paying sectors, Mining and Utilities. Relative wages in the mining sector go up and down, while wages in the utilities sector largely declined across the period of study. Given that this dissertation concerns itself primarily with changes in inequality, the question remains: what caused measured sectoral inequality in Chile to fluctuate, to the extent it did, during the period of study? Changes in relative wages in these two sectors indicate they play an important role.

[112] The Chilean dataset joins "Professional Services" in the same sector as "Finance." In the first stage the data are dominated by workers providing non-financial professional services. This has two implications for comparing these data to those compiled for Argentina and Brazil: first, the sector is larger, and second, relative average salaries are lower. Overall, the effect appears to be a larger contribution from the "financial sector," but this may be slightly misleading. The size and relative wages of the "Finance and Professional Services" sector after the disaggregation is more in line with the other countries of study.

Dynamic Sectors vs. Remaining Sectors

In the period of study, and especially after 1997, inequality in the Chilean economy is relatively stable, leaving a small number of sectors - herein termed 'dynamic sectors' - to drive changes in inequality in Chile. As noted in the discussion of relative average wages and employment shares, the Mining and Utilities sectors are two sectors that employ a small number of people (at under 2 percent and 1 percent of contributors to the social security system, respectively, they employ about 2.5 percent of formally-employed workers) but have the highest wages in the country. The mining sector, in particular, has an outsized impact on sectoral inequality in Chile, exceeded in magnitude only by the financial sector. As can be observed in reviewing the graph of relative average wages, in addition to having the highest average wages these two sectors also have the most volatile wages.

The significance of the role of these two sectors is highlighted by separating them from the rest of the economy, creating two groups of wage-earners: (1) Mining and Utilities, and (2) all other sectors. Using Theil's T statistic, the inequality between these two groups can be calculated, as can the within-group contributions. The result of this calculation is summarized in Figure 7-13.

Figure 7-13. Dynamic Sectors vs. Remaining Sectors

Source: Author's calculations based on SAFP data.

Inequality within the mining and utilities group is almost negligible relative to overall inequality, as these are two small sectors with similar wages (wages in the utilities sector range between 70 and 90 percent of those in the mining sector across the period of study). Observable inequality is concentrated in the inequality between the dynamic sectors and the remaining sectors and the inequality among the remaining sectors. As the remaining sectors include both high wage and low wage sectors, it is reasonable that much of the inequality would be within this group. In the second half of the graph, there is an even greater concentration of inequality within the remaining sectors, which is also intuitive: after 2006 there are more sectors, representing a larger number of workers (because of the number of workers who moved out of "uncategorized" segments - that were excluded from this analysis - and into recognizable sectors), in this group.

What is striking about Figure 7-13 is the degree to which changes in overall inequality in Chile are driven by changes in the inequality between the

Dynamic Sectors and the Remaining Sectors. Particularly before 2006, while there was some movement in the inequality among the remaining sectors, these movements are small: the large movements are a reduction in the inequality between the dynamic and the remaining sectors from 1996 to 1999, a large increase between 2001 and 2002, and a reduction between 2002 and 2004.

This characterization holds from 1995 to 2004; however, from 2004 to the end of the period, responsibility for fluctuations in overall inequality appears to spread out. While changes in inequality between mining and utilities and the remaining sectors continues to drive some of the change in overall inequality, changes in the inequality within the remaining sectors also move in the same direction as the overall inequality, and are as responsible for changes in overall inequality as the between-groups inequality.

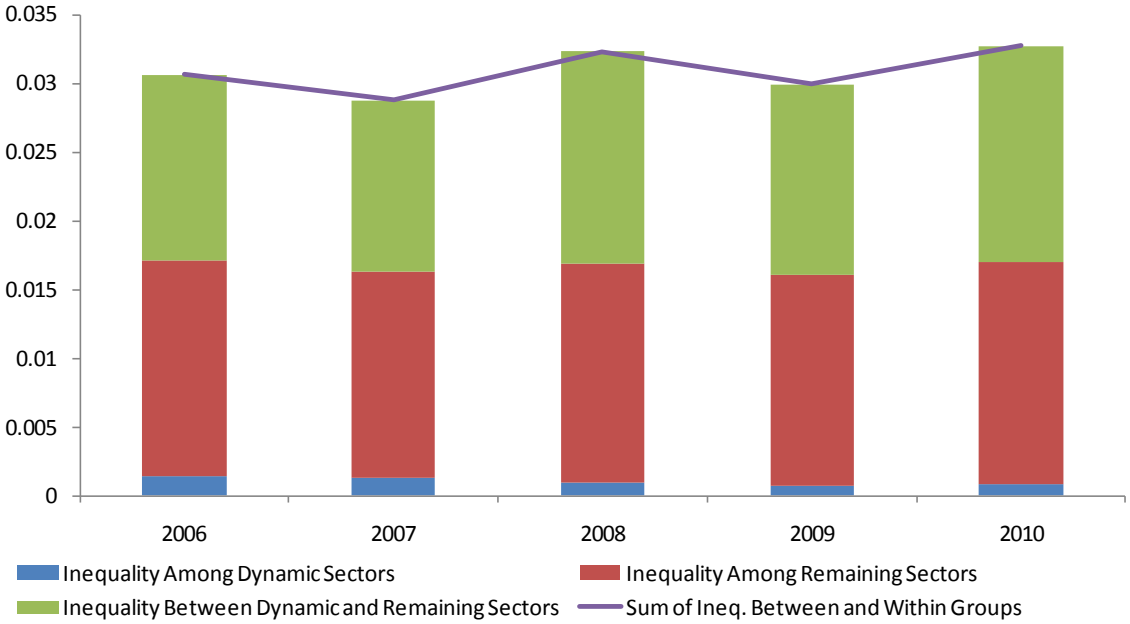
Table 7-1. Share of Contributions to Year over Year Change in Overall Theil, 1995 –Q2 2006.

Year	Year over Year Change (ΔT * 1,000)	Contribution to Year over Year Change in Overall Theil (%)		
		Inequality Among Mining & Utilities	Inequality Among Remaining Sectors	Inequality Between Mining & Utilities and Remaining Sectors
1996	-0.56	-6%	-30%	136%
1997	-2.30	-2%	45%	57%
1998	-3.39	2%	16%	82%
1999	-1.66	1%	18%	81%
2000	-0.10	-58%	565%	-407%
2001	0.73	14%	65%	21%
2002	1.72	5%	-19%	114%
2003	-1.34	3%	29%	68%
72004	-0.75	-14%	-165%	279%
2005	2.81	-4%	44%	60%
2006a	-1.84	-9%	46%	63%
(2006b)	N/A (change in number of sectors)			
2007	-1.88	-2%	50%	52%
2008	3.55	-5%	75%	30%
2009	-2.38	3%	60%	37%
2010	2.80	0%	51%	50%

Source: Author's calculations based on SAFP data.

Analysis of changes in the contributions of the remaining sectors to the inequality within that group indicates that the Financial sector is driving changes in that group's contributions. As such, it can be moved into our group of 'dynamic sectors' for the latter part of the period, as shown in Figure 7-14.

Figure 7-14. Dynamic Sectors Including Finance, 2006-2010



Source: Author's calculations based on SAFP data.

In Figure 7-14, inequality among the remaining sectors again appears quite constant, although changes in this component track changes in overall inequality. Inequality among the dynamic sectors increases as compared to Figure 7-13, as inclusion of the Financial sector has two consequences: this group now represents a larger percentage of the population employed, and the difference in average wages among the dynamic sectors is greater. As with Figure 7-13, Figure 7-14 reveals that in most years the most significant component of changing overall inequality is the change in inequality between the dynamic sectors the remaining sectors: Mining, Utilities, and Finance have been the dynamic sectors of the Chilean economy since 2006.

Table 7-2. Share of Contributions to Year over Year Change in Overall Theil, 2006 Q3 – 2010.

Year	Year over Year Change (ΔT * 1,000)	Contribution to Year over Year Change in Overall Theil (%)		
		Inequality Among Dynamic Sectors (Mining Utilities, Finance)	Inequality Among Remaining Sectors	Inequality Between Dynamic Sectors and Remaining Sectors
2006 Q3 - 2007	-1.88	8%	34%	58%
2007 – 2008	3.55	-9%	23%	86%
2008 - 2009	-2.38	6%	27%	67%
2009 - 2010	2.80	2%	33%	65%

Source: Author's calculations based on SAFP data.

Between the second half of 2006 and the first half of 2010, inequality between the new dynamic sectors (including Finance) is responsible for between 58 and 86 percent of the change in overall inequality.

THE EVOLUTION OF REGIONAL INEQUALITY IN CHILE

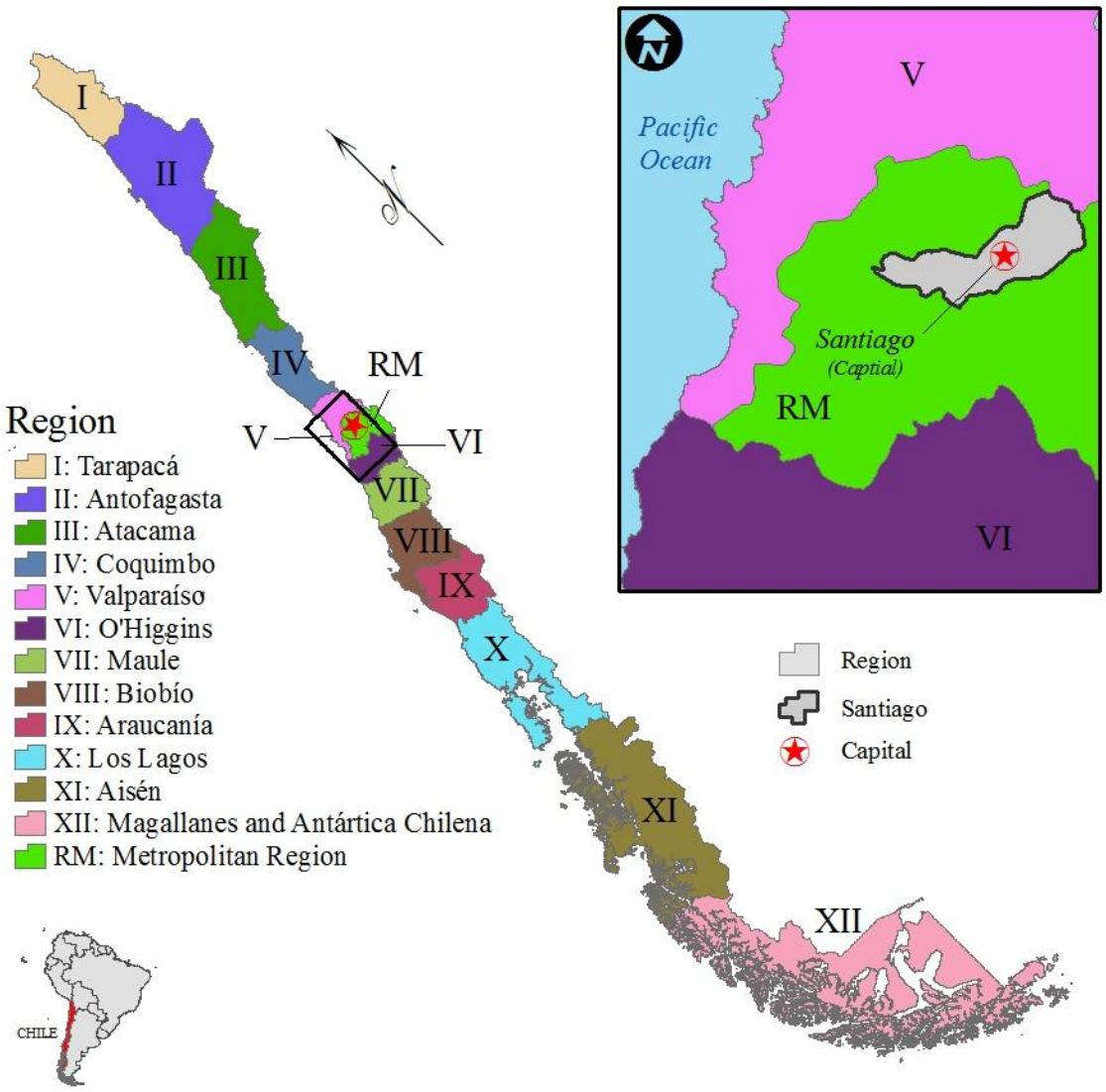
Several perspectives are provided on the spatial distribution of inequality in Chile. Overall regional inequality is first estimated, and then it is decomposed into its between and within regions elements: each are analyzed in detail.

Regional Pay Inequality

Today Chile is divided into 15 regions. Previously there were 13 regions, but two new regions were added in October 2007 by dividing two existing regions: Los Ríos (XIV) was carved out of Los Lagos (X), and Arica-Parinacota (XV) was formed from Tarapacá (I). To maintain regional consistency across the period of study, the previously existing regional structure is maintained in this

dissertation: employment figures and wages earned in Los Rios and Arica-Parinacota are simply added back into the employment and wages of Los Lagos and Tarapacá, respectively, as though nothing had changed.

Figure 7-15. Chilean Geographic Coverage (Regions)

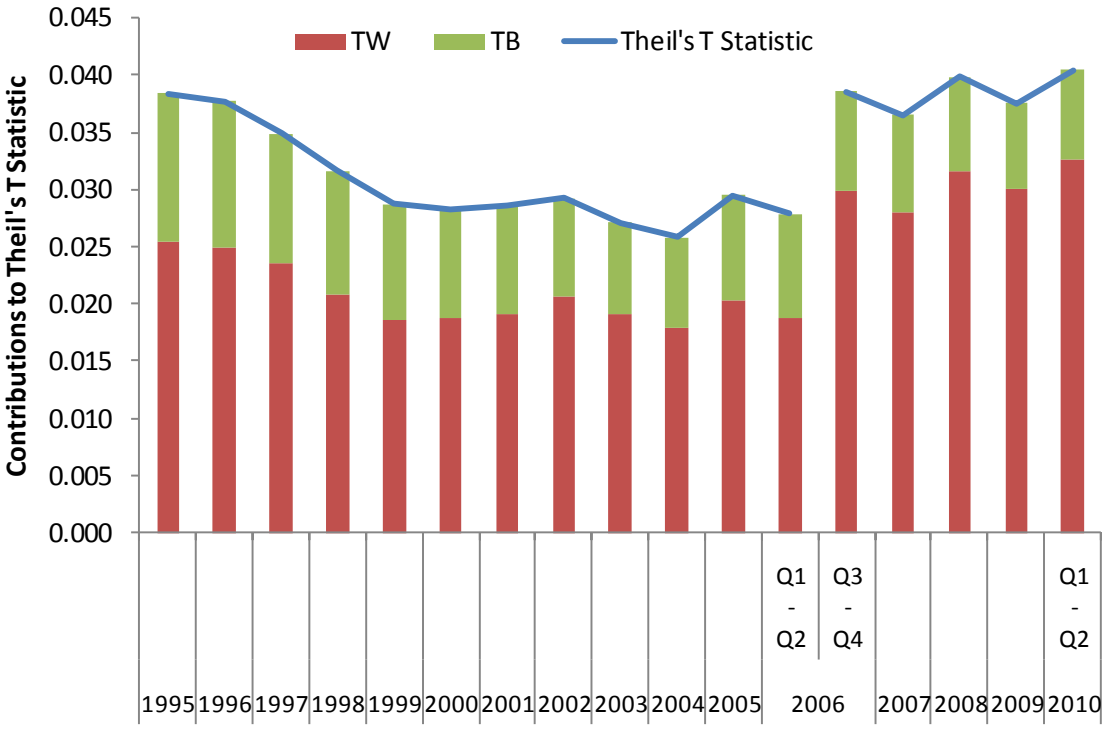


Source: Author.

Between and Within Region Inequality

This section presents overall regional inequality as the sum of inequality between regions and the inequality within regions (in green and red, respectively, in Figure 7-16), where inequality within regions represents the sum of the inequality between sectors within each region weighted by each region's income. The jump in measured inequality between the first and second halves of 2006 reflects the increased resolution of the inequality measure due to the increased disaggregation of the Chilean dataset from what were previously 9 sectors to 18 sectors in the data, as explained in the data and sectoral analysis sections.

Figure 7-16. Between and Within Regions Contributions to Chilean Inequality[113]



Source: Author's calculations based on SAFP data.

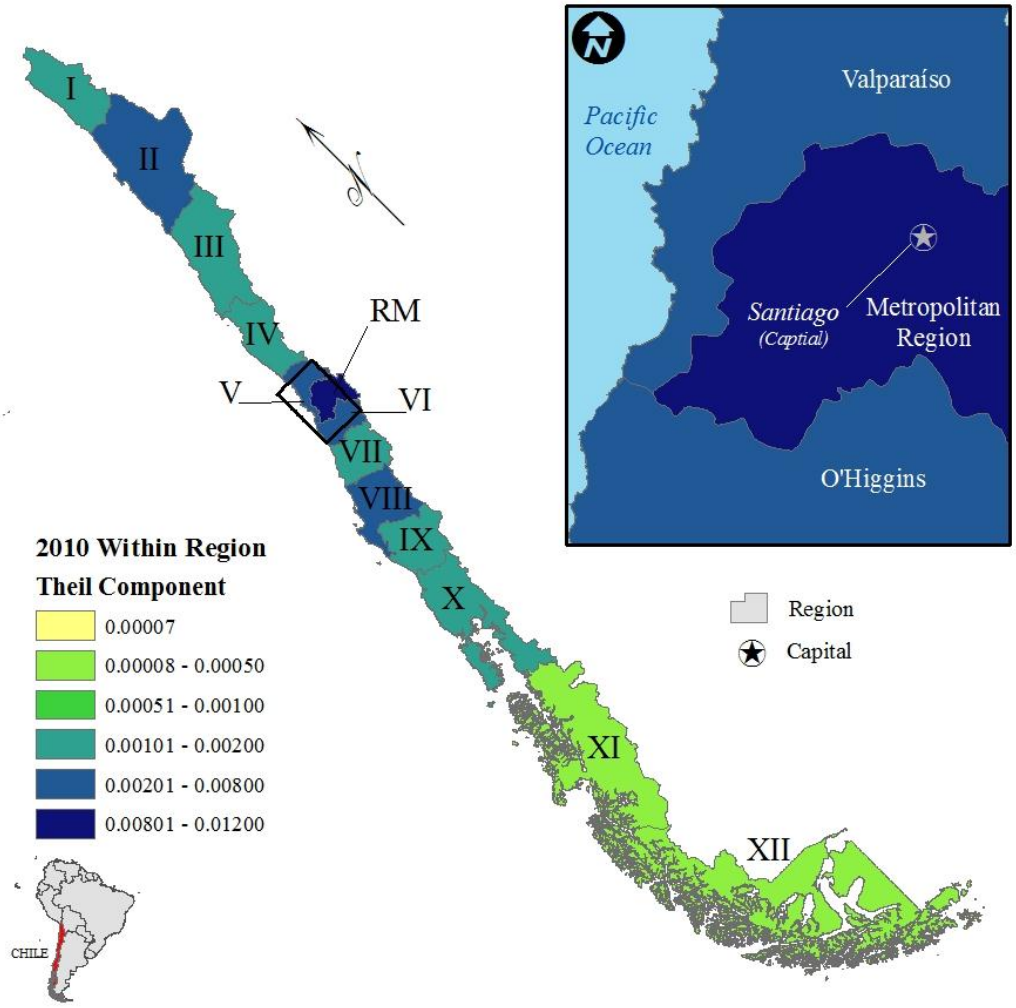
The trends that can be observed are similar to those observed in the sectoral inequality analysis. Initial decreasing inequality can be observed all the way to 2004, though the real declines occur between 1995 and 1999, after which the Theil's T statistic stabilizes until 2002. For the remainder of the period, there are annual oscillations, but the level of inequality in the first half of 2006 is very similar to that of 2002, and the level in the first half of 2010 is also similar to that of the latter half of 2006. Overall pay inequality in Chile did not change significantly in the first decade of the 2000s.

[113] This figure does not include employment or wages classified by sector as "unspecified activities" or "lacking information."

As is typically observed, within-region inequality is larger than that between regions, representing from two-thirds to 80 percent of overall (measured) inequality across the period. The decline in the overall Theil's T statistic from 1995 to 2000 appears driven by decreasing within-region inequality, as TW is clearly decreasing across this period; however, the between-region component is also decreasing during this time, and at a similar rate. Similarly, the decrease in overall Theil between 2002 and 2004 is explained by decreases in both components.

The map in Figure 7-17 shows, for the last year of the series, the within-regions Theil's T statistic for each of Chile's 13 regions.

Figure 7-17. Within-Regions Theil's T Statistic, 2010



Source: Author's calculations based on SAFP data.

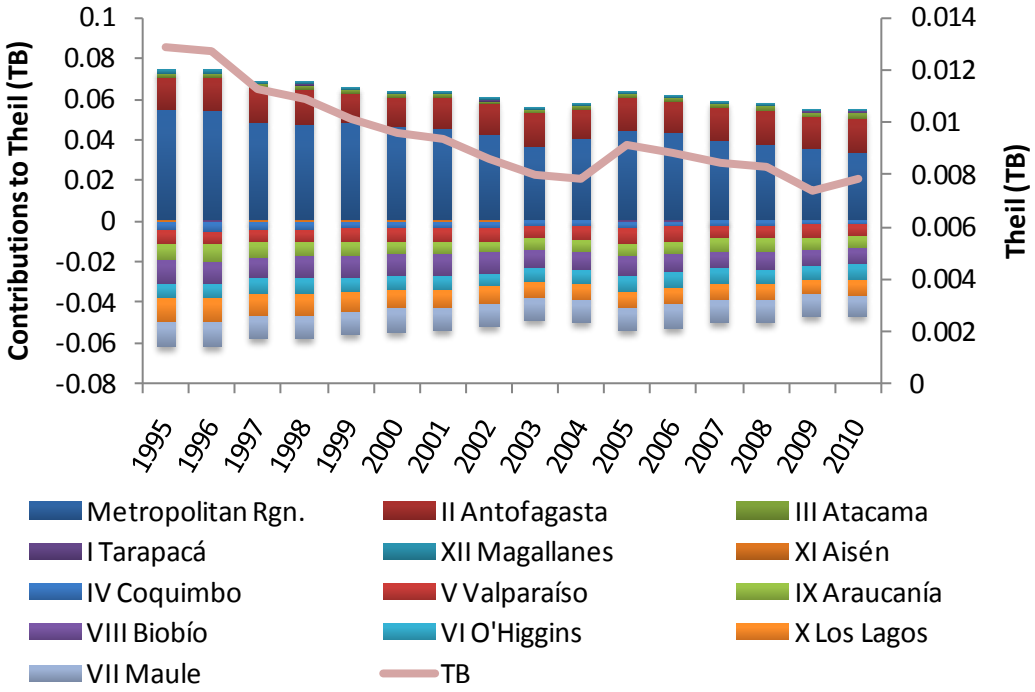
Not surprisingly, the largest contributions come from the center of the country, with the Metropolitan Region being the largest contributor and the two regions surrounding it (Valparaiso and O'Higgins) along with Antofagasta and Bio-Bio also providing large contributions. These regions' significance is due to a mix of population and income effects: while the differences in average salaries in the Metropolitan Region are not as high as in other regions, as of 2010 forty-six

percent of contributors to the Chilean social security system are employed in the Metropolitan Region. Valparaiso (V) is the third largest region in terms of employment with just under ten percent of contributors. Antofagasta's inequality is due to disparities between the significant number employed in its mining sector (12 percent) and everyone else.

Pay Inequality between Regions

Having analyzed the inequality within regions, this section focuses on the second, smaller component of regional inequality: inequality between regions.

Figure 7-18. Pay Inequality between Regions, 1995 – 2010



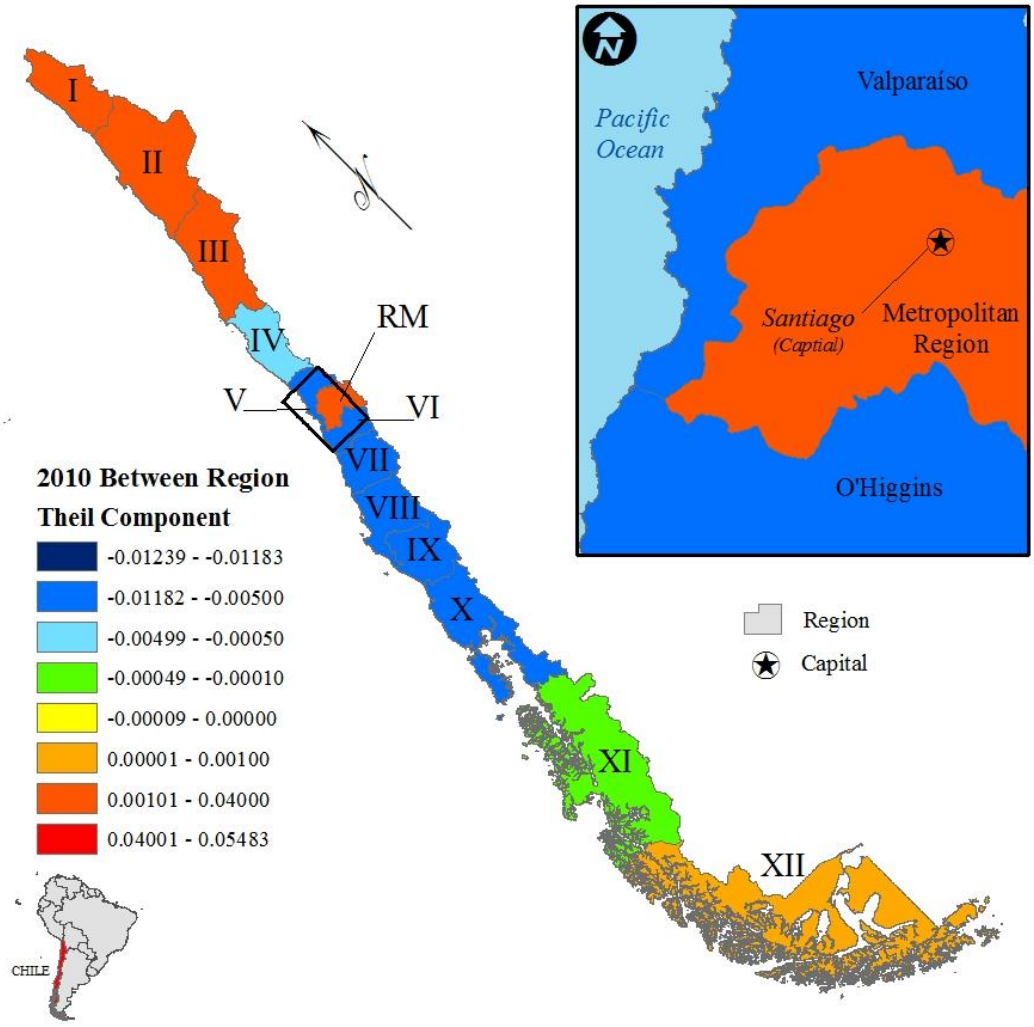
Source: Author's calculations based on SAFP data.

Overall, inequality between regions in Chile is decreasing. There is a break in this trend between 2004 and 2005, and a slight uptick in 2010 that could

indicate the beginning of a reversal, but overall Theil's T drops by over 33 percent across the period (from over 0.012 to about 0.08). The overall trend is explained primarily by a reduction in the contributions of the Metropolitan Region: its contribution diminished consistently from 1995 to 2003, increased between 2003 and 2005, and then declined across the rest of the period. Conversely, the contributions of the three northern regions (Antofagasta, the second largest contributor from above, Atacama, and Tarapacá), where mining forms much of the economy, increase slightly across the period, reflecting, to a limited extent, the increase in commodity price that drove expansion in that sector during the period of study (see Figure D-2, Appendix D).[114] Regions contributing from below have generally decreasing negative contributions: none stands out as having become significantly larger or smaller contributors to inequality from below.

[114] Two factors may work against a greater increase in contributions from the mining-intensive regions: first, due to the type of activity, not all growth is likely to be reflected in wage increases, and second, due to the truncated nature of the data, not all earnings increases in a high-wage sector are likely to be observed.

Figure 7-19. Map of Pay Inequality between Regions, 2010



Source: Author's calculations based on SAFP data.

Workers in some regions are consistently better paid than in others. The regions that contributed to inequality "from above" during the period of study are those high-paying regions with average wages above the national average: the Metropolitan Region; Antofagasta (II); Atacama (III); Magallanes and the

Chilean Antarctic (XII); and, in some years, Tarapacá (I).[115] While all these regions have above-average wages, the Metropolitan Region and Antofagasta are the dominating regions in terms of contributions from above to Theil's T statistic.

These two regions provide examples of two very different ways in which a "high pay" region can make a contribution to Theil's T – one by providing good wages to a large number of people (the Metropolitan Region), and the other by providing significantly above-average wages to a much smaller group of people (Antofagasta), a subject to which this dissertation returns in the discussion dedicated to these two regions.

The high pay regions also have the highest GDP per capita levels in Chile. Antofagasta, the northern region with significant mining activity, leads the country in this respect: at $27,061 USD per capita (PPP as measured in 2008 USD) in 2008, its GDP per capita was fully 40 percent more than that of the second highest region, Magallanes, a sparsely populated region of the south of Chile ($19,151). The top five regions in GDP per capita are rounded out by two more mining regions - Tarapacá with $17,475 and Atacama with $16,768 - and the Metropolitan Region ($15,472). On the low end of the spectrum, workers in Coquimbo (USD 8,296) and La Araucanía (USD 6,167) produce less than one fifth, in terms of GDP per capita, than workers in Antofagasta (Lefin 2009).

In terms of economic activity, what distinguishes the high pay regions is that three of them are areas of intensive mining in the north of Chile: Tarapacá

[115] It is no coincidence that the regions with the least poverty, according to the results of the CASEN (2009) belong to the group of high pay regions: Antofagasta (8,0%), Magallanes (9,1%) and the Metropolitan Region (11,6%), while those with the highest incidence of poverty are Araucanía (27,1%), BioBio (21,0%), Maule (20,7%) and Los Ríos (20,4%) belong to the group of low pay regions (see Figure A-2 of the appendix).

(I), Antofagasta (II) and Atacama (III) with 33 percent, 53 percent, and 36 percent of GDP produced in each region's mining sector, respectively (see Figure D-3, Appendix D - Mining Portion of-Regional GDP Derived from Mining, 2008). The roles of the financial sector and of industry are pronounced in the Metropolitan Region, while a number of factors converge to make Magallanes (XII) a high-pay region. As explained below, despite its sparse population, Magallanes is a dynamic region with a diverse economy.

On the other hand, the distinguishing characteristic of low pay regions is that their economies rely heavily on the following set of activities: manufacturing, agriculture, forestry, and fishing.

While the economies of the various regions are diverse and include a wide range of economic activity, a basic typology of the region's economies can be constructed according to the primary areas of activity in each region:

Table 7-3. Typology of Chilean Economic Activity by Region

Primary Activity	**North**	**Center-North**	**Center-South**	**South**
Mining	Tarapacá (I), Antofagasta (II), Atacama (III)	Coquimbo (IV) *		
Manufacturing		Valparaíso (V), Maule (VII), Metropolitan Region	BioBío (VIII)	Magallanes and Antártica Chilena (XII)
Agriculture-Forestry		Coquimbo (IV) O'Higgins (VI)	Maule (VII), Araucanía (IX)	
Fishing				Los Lagos (X), Aisén (XI), Magallanes and Antártica Chilena (XII)
Finance		Metropolitan Region		

* For most regions, the area of economic activity under which they are listed is clearly the dominant activity: with mining, this is the case for Tarapacá (33 percent of GDP), Antofagasta (53 percent), Atacama (36 percent). However, some regions' economies are a bit more diverse and do not have a sector that so clearly dominates. This is the case of Coquimbo (IV): it's mining sector represents only about 16 percent of its economy, as does Agriculture and Forestry. As such, it appears twice in the typology. This analysis is based on GDP figures of 2008 (see Table D-1 of Appendix D).

The discussion of regional inequality in Chile proceeds with some detailed description of the characteristics of the high pay regions and the low pay regions, commenting further on the typology in Table 7-3.

High Pay Regions

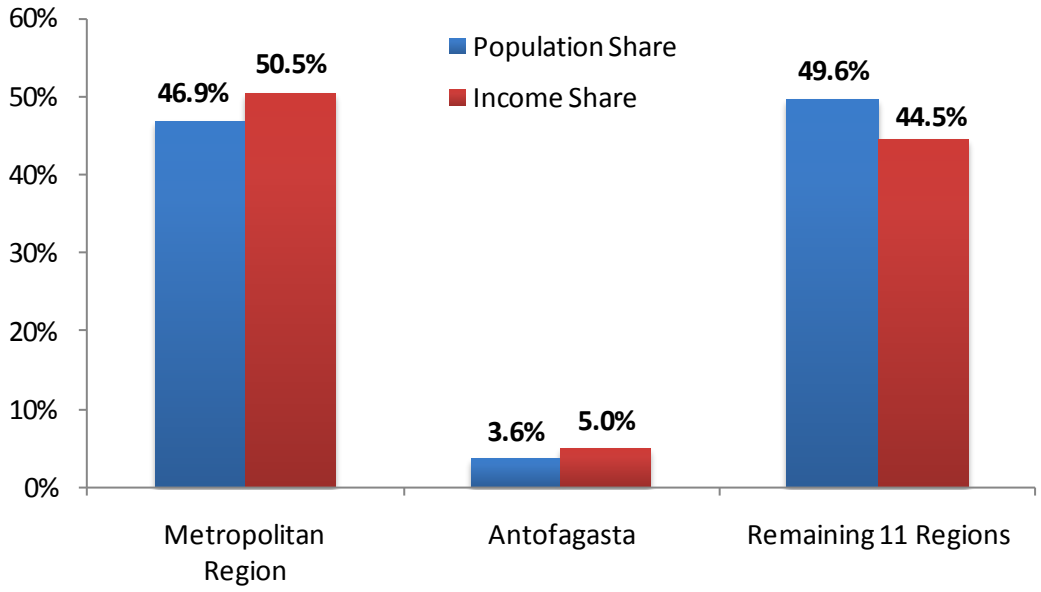
High pay regions are described in decreasing order of their contributions to inequality between regions from above.

The Metropolitan Region and Antofagasta

As previously mentioned, these two regions provide examples of two very different ways in which a "high pay" region can make a large contribution to

Theil's T – one by providing good wages to a large number of people (the Metropolitan Region), and the other by providing significantly above-average wages to a much smaller group of people (Antofagasta).

Figure 7-20. Population and Income Shares[116]



Source: Author's calculations based on SAFP data.

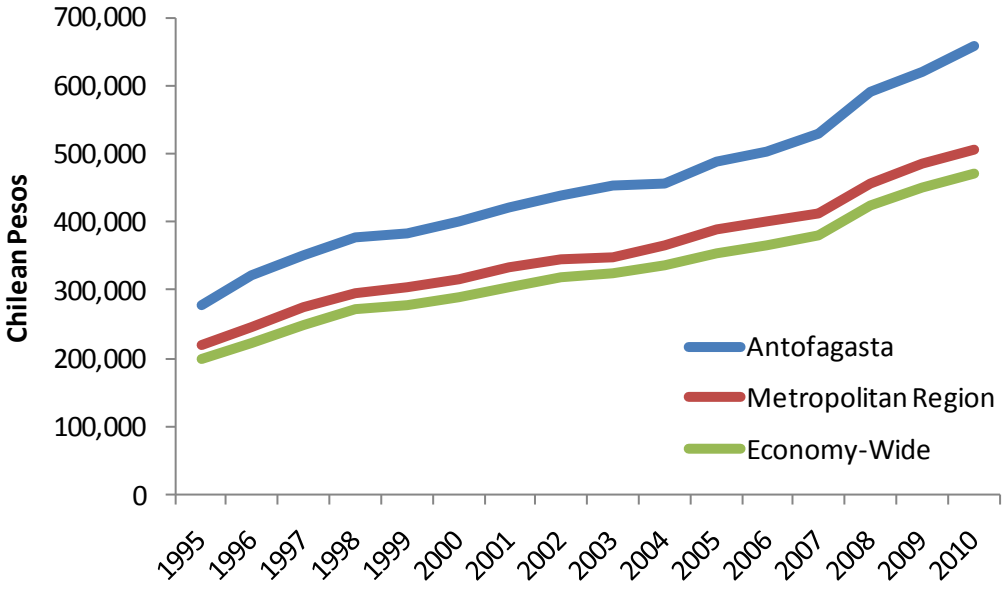
Across the period of study, these two regions employ about 50 percent of the employed population while taking in over 55 percent of reported wages. As shown in Figure 7-20, the Metropolitan Region dominates. The population share of Antofagasta has oscillated between 3 and 4 percent over the period of study, while its income share varied between 4.6 and 5 percent: the Metropolitan Region's population share was between 45 and 49 percent over the period, while

[116] Population and Income Shares are calculated from the administrative data sets of the SAFP used in the Theil's T statistic calculations provided in this chapter. Population and income shares are the two key elements used to calculate a region's contribution to Theil's T between regions.

its share of wages moved in a similar range - between 50 and 53 percent over the entire period.

According to the latest survey implemented by INE (in 2009), only 3.5 percent of the employed population in Chile is employed in Antofagasta. Because Antofagasta it is a relatively small region with a small population and therefore small population share and income share, Antofagasta can only be a large contributor to inequality from above because of high wages: Figure 7-21 shows by how much average wages in Antofagasta outpace not only the average wages in the overall economy, but also those of the Metropolitan Region.

Figure 7-21. Average Wages



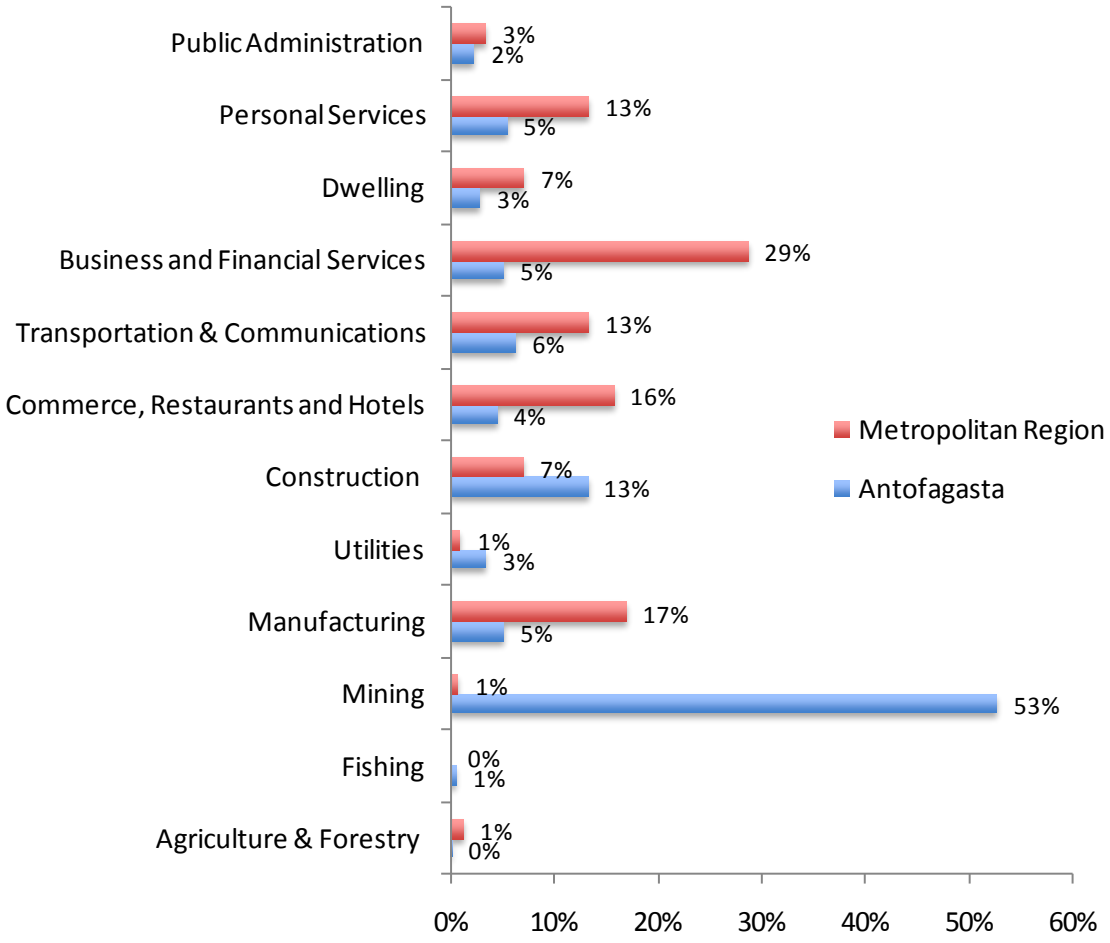
Source: Author's calculations based on SAFP data.

Not only have average salaries in Antofagasta been well above the national average across the period of study, they have grown faster than overall average wages: even as inequality between regions was declining overall in

Chile, Antofagasta has resisted that trend. This trend coincides with increases in the global price of copper, and, accordingly, an increase in the value of Antofagasta's exports.

To further demonstrate how Antofagasta and the Metropolitan Region take different paths to being the drivers of regional inequality in Chile, Figure 7-22 shows the share of GDP by sector in the two regions. A high level of activity in mining and the associated chain of economic activity, which contributes almost 53 percent of Antofagasta's GDP, has helped make Antofagasta the region with the highest average taxable income in the country during the period of study.

Figure 7-22. GDP Shares by sector in Chile, 2008



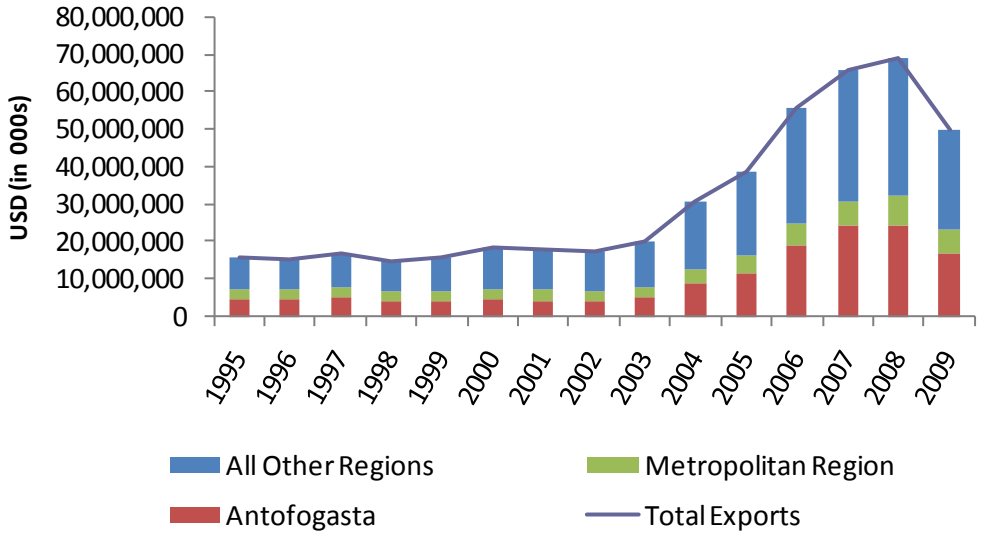
Source: Central Bank of Chile.

Unlike in other high-pay regions, the mining sector is responsible for only 0.7 percent of the Metropolitan Region's GDP in 2008. Instead, fifty percent of the Metropolitan Region's GDP is produced in two sectors - financial and business services (33 percent) and manufacturing (17 percent), neither of which factor heavily in the economies of other high-pay regions.

Exports

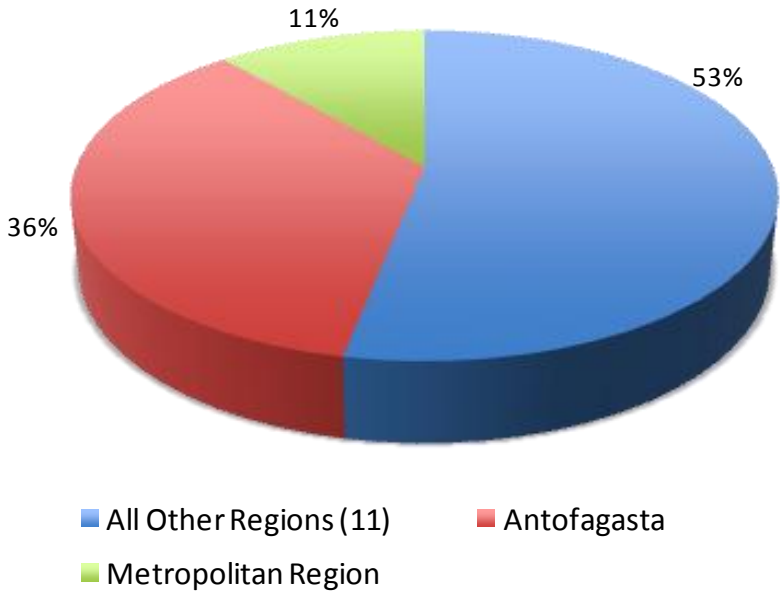
Figure 7-23 provides the distribution of Chilean exports by the Metropolitan Region, Antofagasta, and the remaining regions combined: Figure 7-24 spells out the shares of Chilean exports by each of these three in 2008.

Figure 7-23. Exports from selected Chilean Regions



Source: Central Bank of Chile.

Figure 7-24. Share of Exports (2008)



Source: Central Bank of Chile.

Antofagasta and the Metropolitan Region export fifty percent of all Chilean exports. Antofagasta itself is responsible for a large percentage of Chilean exports: from 28 percent of total national exports in 1995, Antofagastan exports rose to over 36 percent in 2008, greatly exceeding the export share of the Metropolitan Region, which was only 11 percent.

Antofagasta is a special case within Chile. As has been demonstrated, it makes the second largest contribution from above to regional inequality. Nevertheless, there are four regions with more overall income (it has only the fifth-highest income share), and the number of persons employed in Antofagasta does not place it in the top five regions in terms of employment. These facts are due to its small total population (about 540,000 in 2009, or 3.2 percent of the country's population). Nevertheless, another characteristic explains why it is a

high-pay region: the significant role of the mining sector. Mining in Antofagasta contributes more to that region's GDP than in any other region (as shown in Figure D-3 of Appendix D). Related to its mining sector, Antofagasta also has a lot of construction activity – basically, high-value construction of infrastructure for facilitating exploitation of the mines. Taken together, these two sectors produce two thirds of the region's GDP (see Table D-1, Appendix D). Antofagasta's mining activity also explains its large share of Chilean exports (36 percent in 2008), of which minerals – primarily copper and iron - made up 95 percent that year (see Figure D-4 of Appendix D, Antofagastan Exports by Economic Sector, 2008). Despite its small size, mining in Antofagasta is also the determining factor in Antofagasta having the fourth largest GDP of all the regions of Chile (see Figure D-5 of Appendix D, Regional GDP as a Share of Total GDP).

Tarapacá (I) and Atacama (III):

Tarapacá (I) and Atacama (III) follow Antofagasta and the Metropolitan Region in being high-pay regions in Chile across the period of study. Lightly populated[117] and located on either side of Antofagasta in the north of Chile, their small shares of the overall population (and of persons reporting taxable income) explain why they do not figure among the nation's most important in any of the following categories: contributions to GDP, share of total exports, and, in the Theil calculations, income share or population share (the top five are listed in Table D-2, Appendix D).

[117] In 2009, the population of Tarapacá grew to 469,000 inhabitants, or 2.8 percent of Chile's population. With 270,000 residents, only 1.6 percent of the population lives in Atacama (see Table A-3 of the Appendix, 2009 Chilean Population).

However, their presence on the high-pay side of the Chilean wage spectrum is for the same reason that Antofagasta plays such a significant role – the mining industry forms a substantial part of their economies (see Figure D-5, Appendix D). Atacama and Tarapacá are second and third, respectively, in contributions from the mining sector to their respective regional GDP, after Antofagasta. In 2008, 36 percent of the GDP of Atacama, and 33 percent of that of Tarapacá came from mining. The importance of the mining sector in these regions is also reflected in their exports. In 2008, Atacama and Tarapacá were each responsible for 7 percent of Chilean exports. Of their exports, 95 percent and 90 percent, respectively, came from the mines (see Figure D-6 through D-8, Appendix D).

Magallanes and the Chilean Antarctic (XII)

Region XII, which is herein termed simply Magallanes, is the last region with above average wages. Chile's southernmost region is part of the Chilean Patagonia, along with Aisén. Given its extreme location, it is unsurprising that its population is the second lowest of Chilean regions, with only 0.9 percent (Table D-3, Appendix D).

Despite its tiny population, Magallanes is a dynamic and economically diverse region. In 2008, Magallanes scored highest of all regions in the country in a national index of regional competitiveness (Indice de Competitividad Regional, or ICR), (SUBDERE, MIDEPLAN *et al.* 2009).[118] There is mining activity – in

[118] The ICR is prepared by the Ministry of Planning (Ministerio de Planificación, or Mideplan), the National Statistical Institute (INE) and the Sub-Secretary for Regional and Administrative Development (la Subsecretaría de Desarrollo Regional y Administrativo, or SUBDERE). It is an index that measures the potential of the regional economic system to generate and maintain sustained growth in the per capita income of its inhabitants according to seven factors: economic

particular, oil and gas production - but other sectors are also important. Forestry, cattle- and sheep-raising, fishing, and tourism are important pieces of Magallanes' economy. However, with a population share and income share below 1 percent, the contribution of this region to overall inequality is essentially negligible.

Low Pay Regions

The remaining regions contributed to inequality "from below": Aisén (XI), Coquimbo (IV); Valparaíso (V), Araucanía (IX); Biobío (VIII); O'Higgins (VI), Los Lagos (X); and Maule (VII).[119] Of these, Valparaiso and Biobío merit discussion due to their relative economic importance.

Valparaíso (V) and Biobío (VIII)

Valparaíso and Biobío are the two most populous regions of Chile after the Metropolitan Region: Biobío has just under 2 million inhabitants, while Valparaíso has about 1.7 million, representing 12 percent and 10.3 percent of the Chilean population, respectively (see Table D-3, Appendix D). Correspondingly, their population shares and income shares are also the second and third largest in the country: taxable income in the two regions is 10 percent and 9 percent, respectively, of reported income. Though they lag far behind the Metropolitan Region's 43 percent in their contributions to Chilean GDP, they are also second

---

outcomes; businesses; persons; innovation, science and technology; infrastructure, governance; and natural resources (SUBDERE, MIDEPLAN *et al.* 2009).

[119] There is rigidity in the relative position of regions: with the exception of Region I, no region that was high pay became low pay, or vice versa. Region I vacillates because average wages in that region are very close to the national average, not because of fundamental changes in its wage structure.

and third in this category with about 8 percent (Valparaíso) and 9 percent (Biobío), as shown in Table D-2 of Appendix D.

Economic activity in both regions is most heavily concentrated in manufacturing. The same four sectors are of greatest importance to the economies of both regions, as shown in Table 7-4.

Table 7-4. Economic Sectors' Contributions to GDP in Valparaíso and Biobío

Sector	Percent of Region's GDP (2008)	
	Valparaíso	Biobío
Manufacturing	28	36.1
Personal Services	12	13.5
Transport & Communications	11	8.6
Financial and Business Services	11	8.4
Total	62	66.6

Source: Central Bank of Chile.

These two regions and the Metropolitan Region are the manufacturing center of the country: eighty percent of Chilean manufacturing happens in these three regions. In 2008 the value of manufactured goods from the three regions was as follows (in millions of Chilean Pesos): the Metropolitan Region produced PS 4,762,000 (46 percent of national manufacturing GDP), Biobío produced 2,096,000 (20 percent), and Valparaíso produced 1,415,000 (14 percent), according to 2008 figures from the Chilean Central Bank.

While the two regions seem quite similar, the exports of the two regions show how they differ. Each region provides about 8 percent of Chilean exports, but the products they export are somewhat different (see Figure D-6 of Appendix D). The most significant exports of Valparaíso in 2008 were copper and iron (42 percent), followed by refined petroleum and petroleum derivatives (23 percent),

and fruit (12 percent). In contrast, forest resources and derivative products dominate Biobio's exports: cellulose, paper and cardboard products made up 39 percent, while raw forest resources made up another 30 percent. Food products (15 percent), refined petroleum and petroleum derivatives (8 percent), and other products (remaining 7 percent) made up its remaining exports (see Figures D-9 and D-10 of Appendix D).

Remaining Low-Pay Regions

The remaining low-pay regions rely heavily on Agriculture, Forestry, and Fishing for large portions of their respective economies.

CONCLUSIONS

Analysis of the Chilean economy from the various perspectives that can be gained from applying Theil's T statistic to different sub-groupings of the Chilean economy sheds additional light on some persistent trends that have been commented on in other academic and economic literature. From a sectoral perspective, inequality decreased in the period - though mostly at the beginning - driven by reductions in relative contributions from the mining and finance sectors. The observed decline in inequality between regions in Chile appears to be largely a function of decreasing contributions from the Metropolitan Region and increasing contributions of Chilean mining regions.

Sectoral Perspective

Inequality between economic sectors decreased in the period of study, though the majority of the decrease happened early in the period, after which between sector inequality is somewhat volatile, but neither increases nor decreases significantly. The sharp decrease in between-sector inequality at the

beginning of the period is due primarily to significant reductions in the contributions of the finance and mining sectors: the fluctuations in the last decade appear largely attributable to volatility in the countries' three highest pay sectors: mining, utilities, and finance.

Regional Perspective

Inequality between regions declined relatively consistently across the period. There are two pockets of high pay in Chile: the Metropolitan Region and the northern mining regions, particularly Antofagasta.

Antofagasta is a symbol of the success and, at the same time, precariousness of the Chilean economy. With less than 4 percent of the formally-employed population, the concentration of mining activity in this region makes it the region with the highest average pay and the second-largest contributor to inequality between regions. Nevertheless, there is a downside of having so much of the Antofagastan – and, more generally, the Chilean – economy concentrated in the extraction of its mineral resources. In short, much of the nation's earnings – including rents not measured in this analysis of pay inequality – flow to relatively few hands. Much of what is earned from the mines leaves the region, as much of the domestic ownership is the state mining company, the National Copper Corporation of Chile (Corporación Nacional del Cobre de Chile, or CODELCO). CODELCO, and other mines are owned or operated, in partnership with CODELCO, by foreign mining interests.

A slight (three percent) decline in the Metropolitan Region's income share represents a small movement in the direction of diversification. The Metropolitan Region's relative decline was the gain of the rest of the country: only one other

region (Region X) saw its income share decrease across the period of study. While the Metropolitan Region's relative decline is not huge, its impact is significant because that region employs almost 50 percent of the population. Furthermore, the decline is accompanied by a slight decrease in the share of employment in the Metropolitan Region (about 1 percent), which does not reflect loss of employment in the Metropolitan Region, but simply a higher rate of employment growth outside the capital area than within it.

Chapter 8: Integration and Conclusions

The three chapters preceding this chapter present evidence from Argentina, Brazil, and Chile about the evolution of inequality from the early 1990s into the latter part of the first decade of the 2000s. While each country study presents some unique elements, three main findings can be generalized from the analysis of these three countries:

1. Decreasing inequality in the 2000s in each of the countries of study regardless of their trajectories in terms of inequality in the previous decade. This is especially significant considering that, despite some ups and downs, the general trend in these countries since the 1960s and 70s had been increasing.
2. The roles of a few key geographic units explain observed changes in inequality between geographic units[120] in the three countries of study.
3. The roles of a few key sectors explain the observed changes in inter-sectoral inequality in the three countries of study.

As mentioned above, the changing contributions of a few key members of the geographic and sectoral groupings into which overall inequality is decomposed play a great role in explaining the broad movements in inequality in these countries. Geographically, the large relative populations and concentration of high-paying jobs in the major metropolitan centers naturally leads those areas to stand out: other geographic units that stand out

[120] In this chapter, recognizing that each country of study employs a different name to refer to the same (or comparable) political division (Provinces in Argentina, States in Brazil, and Regions in Chile) the convention adopted is "inequality between geographic units" rather than "inter-regional inequality" to avoid confusion.

are those with relatively small populations but high average wages due to the concentration of high-pay sectors (e.g. mining-intensive Chilean north, Patagonian petroleum-producing provinces in the south of Argentina). Sectorally, three groups stand out: Finance, Extractive Industry (including both "metallic minerals" – e.g. copper, gold, and silver - and "energy minerals" – essentially, oil and natural gas), and Civil Service.

This chapter develops the dissertation's central findings by integrating the geographic and sectoral analyses of each country of study from the previous three chapters. It begins with a presentation of the broad trends in inequality in the countries of study, showing this dissertation's calculations of the between-group and within-group components of geographic inequality for each country of study, as well as the overall inequality trend in each considering both sectoral and geographical components.

The following section presents the broad trends from the analysis of inequality between the comparable geographic units for each country of study (regions in Chile, provinces in Argentina, and states in Brazil), which is followed by an explanation of the structure of geographic inequality in the countries of study, commenting on both high and low pay geographical units. Figures 8-3 through 8-5 demonstrate the extent to which the change in geographic inequality is dominated by the performance of key metropolitan areas: Buenos Aires City, Sao Paulo (state), and Chile's Metropolitan Region of Santiago. The section concludes with a discussion of the changing contributions of high pay geographic units, showing how the declining contributions of the metropolitan centers are opposed by ascending contributions from other regions in each

country. Maps are presented showing how contributions changed between the years in which geographic inequality peaked in each country and the end of the period of study.

The discussion of geographic inequality is followed by a similar discussion of the inequality between economic sectors in Argentina, Brazil and Chile, narrowing in on the roles of the "big three" sectors: Finance, Civil Service, and Extractive Industry[121]. The structure of sectoral inequality in the countries of study is presented, followed by a discussion of the extent to which the big three sectors drive the changes in each country's sectoral inequality.

There is a clear relationship between the observed trends in geographic inequality and the trends in sectoral inequality: the following section briefly discusses this relationship, highlighting the concentration of key economic sectors in the most dynamic geographical units.

To this point, the chapter focuses on synthesizing the dissertation's key findings, integrating the results from the single-country studies. Having completed this synthesis, the chapter pivots to explore the relationship between the findings and the macroeconomic context.

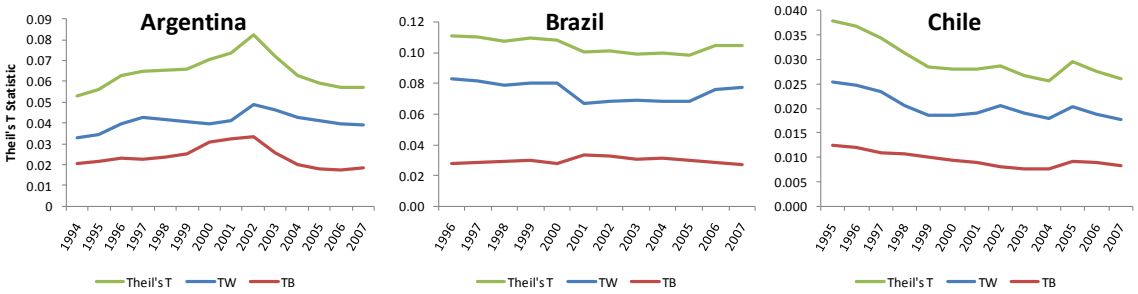
The discussion of macroeconomic context is followed by presentation of the implications for policy that can be derived from the entire analysis. Last but not least, this final chapter ends with a discussion of the main limitations of this research and suggestions for further research.

[121] In this chapter, "Extractive Industry" and "Mining" are used interchangeably.

BROAD TRENDS IN INEQUALITY IN THE COUNTRIES OF STUDY

Figure 8-1 presents this dissertation's calculations of the between-group and within-group components of geographic inequality for each country of study, the sum of which provides an 'overall' inequality over the period of study.

Figure 8-1. Geographic Inequality in the Countries of Study



Source: Author's calculations based on SIPA, CEMPRE and SAFP data.

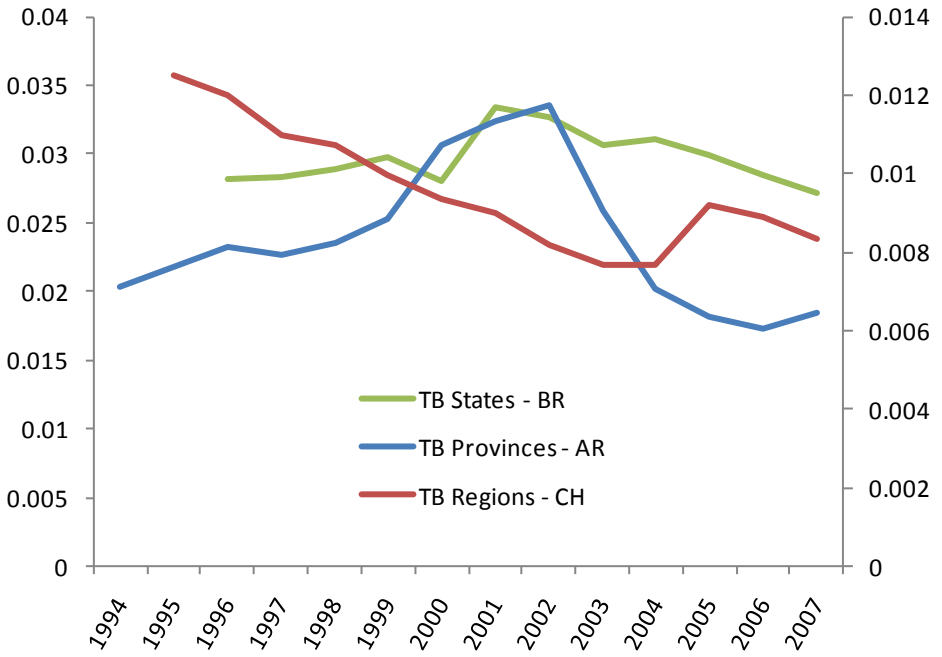
Figure 8-1 illustrates a key point on which the premise of this analysis is built: that the between groups component of Theil's T statistic represents a lower bound on overall pay inequality, and, furthermore, that understanding the movements in these between-groups components is sufficient to capture broad movements in inequality. The within-geographic units component presented in Figure 8-1 is also a between-groups estimate (between sectors within each geographic unit). In both cases, the trends are similar to the overall trend in Theil's T statistic.

Empirical evidence based on geographical and sectoral aggregations of wage and employment data from the countries of studies confirms the dissertation's first finding: pay inequality declined in the countries of study in the 2000s, as developed in the following two sections.

GEOGRAPHIC ANALYSIS OF INEQUALITY IN COUNTRIES OF STUDY

Figure 8-2 presents the trends in inequality between geographic units calculated for each of the countries of study.[122]

Figure 8-2. Between Geographic Units Component of Theil's T: Argentina, Brazil, and Chile



Source: Author's calculations based on SIPA, CEMPRE and SAFP data.

As Figure 8-2 shows, the geographic dimensions of inequality in the three countries took different trajectories in the period of study. Argentina's increased significantly until 2002, after which it decreased even more dramatically. Brazil had a similar trend, though both its increases and decreases were more subtle. Chilean inequality followed a generally decreasing trend across the period of

[122] Because (at least in part) Chile has the fewest geographic units, the inequality measured with the between-groups component of Theil's T for Chile was significantly lower than that for Argentina or Brazil. For this reason – and because comparisons of the gross values of Theil's T calculated for different countries are not meaningful - T^B for Chile is plotted on a secondary axis.

study. However, what is remarkable, as pointed out above, is that by the early 2000s the overall trend in geographic inequality is decreasing in Argentina and Brazil: a decreasing trend in inequality in Chile is observed across the period.

Geographic Structure of Inequality - High Pay Geographical Units

The most important high pay geographic units, in terms of their contributions to inequality, are those that contain the countries' major metropolitan centers. In Argentina this is Buenos Aires City, the Federal Capital, in Chile this is the Santiago Metropolitan Region, home of the city of Santiago, the capital and largest city of Chile, and finally, in Brazil this is Sao Paulo state, home of the city of Sao Paulo. These geographic units share a number of defining characteristics: as the largest cities, or homes of the largest cities, in each country, they are the primary engines of their countries' economies. They are responsible for large shares of their countries' employment and, while employment is diverse (including both manufacturing[123] and service-based activities), they have a high concentration of service activities as compared to the rest of their respective countries. In particular, Buenos Aires City, Sao Paulo City, and Santiago City are all home to their countries' financial sectors. Buenos Aires City and Santiago City are also the centers of political power in their respective countries, with consequent employment in Civil Service and other professional services.[124]

[123] This is less true for Buenos Aires City than for Sao Paulo state and Chile's Metropolitan Region because the geographical unit includes only the city itself, and much of Buenos Aires's industrial activity occurs in Buenos Aires Province.

[124] While most of Chile's government apparatus is in Santiago, Valparaiso is home to Chile's legislative branch.

In addition to the geographical units containing each country's principal metropolitan center, the countries of study have other "High Pay" geographical units.[125] While their contributions to inequality are generally much smaller than those of the geographic units containing the primary metropolitan centers, their changing contributions also help shape overall changes in between-geographic unit inequality. In Argentina, these are four of the five Patagonian provinces of the country's south: Neuquén, Tierra del Fuego, Santa Cruz and Chubut. Rio de Janeiro state and Brasilia (the Federal District) stand out in Brazil. Chile's three northernmost regions are joined by the southernmost region of Magallanes and the Chilean Antarctic on the high pay side of the spectrum in that country.

High-pay geographic units outside of the key metropolitan centers in Argentina and Chile are characterized by low population and concentration of economic activity in extractive industries: petroleum, gas and mining in the Argentine Patagonia and mining, primarily of copper, in the north of Chile.

Brazil is a bit different, because it has two important geographic units in addition to Sao Paulo: Rio de Janeiro state and Brasilia (the Federal District). As described above, Sao Paulo city is the country's financial center, and Sao Paulo state is the country's industrial engine; however, unlike Buenos Aires and Chile's Metropolitan Region, Sao Paulo is not the country's political center; rather, the Federal District is home to all three branches of Brazil's federal government. Rio Janeiro state is Brazil's second-largest economy, with important industrial and service sectors.

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[125] As in preceding chapters, groups with average wages above the national average are considered "high pay," while those with average wages below the national average are considered "low pay."

Geographic Structure of Inequality - Low Pay Geographical Units

Geographical units making the largest contributions from below in the countries of study have common defining characteristics: they are major centers of formal employment, with regional economies concentrated in primary (Agriculture) and secondary (Manufacturing) activities. These geographical units, far from being the poorest (in terms of contribution to GDP) in their respective countries, make large contributions from below because their strong employment provides a large population weight to their contribution to between-geographic unit inequality.

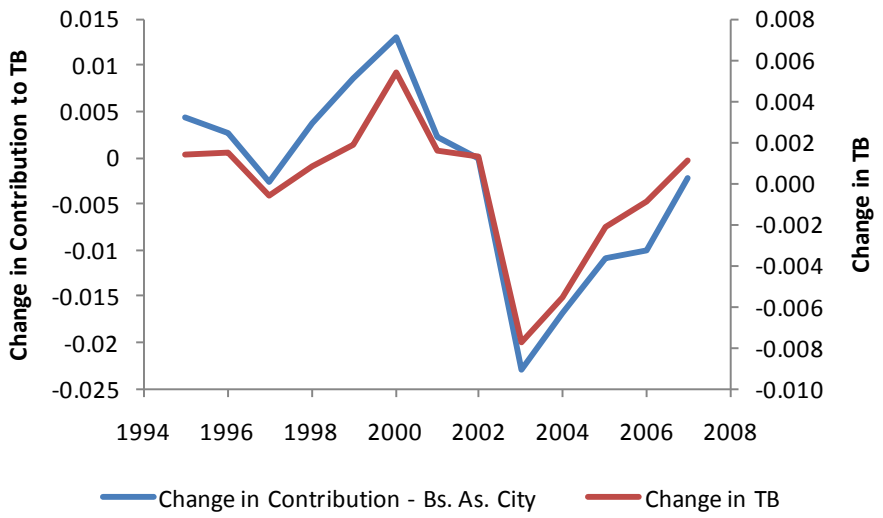
The large low-pay provinces of Argentina are Buenos Aires Province, Córdoba, Santa Fe, and Mendoza. Important low-pay Brazilian states are Minas Geraís, Bahia, Ceará, Pernambuco, Paraná, and Santa Catarina. In Chile, Maule (VII), Los Lagos (X), O'Higgins (VI), Bio-Bio (VIII), Valparaiso (V), Araucanía (IX) are the major low-pay regions.

Dominant Component of Change in Inequality between Geographic Units

As explained above, a key feature of geographic inequality in all three countries of study is the role of key metropolitan centers: Buenos Aires City, Sao Paulo (state), and Chile's Metropolitan Region of Santiago. Figures 8-3 through 8-5 present the relationship between the year-over-year changes in the contributions to between-geographic unit inequality of these three major geographic units and the changes in between-geographic unit inequality in their respective countries.[126]

[126] To highlight the relationship between changes in the key geographic units' contributions and changes in between-geographic unit inequality (T^B), they are presented on separate axes. Because the T^B is composed of the positive and negative contributions of all component members of an

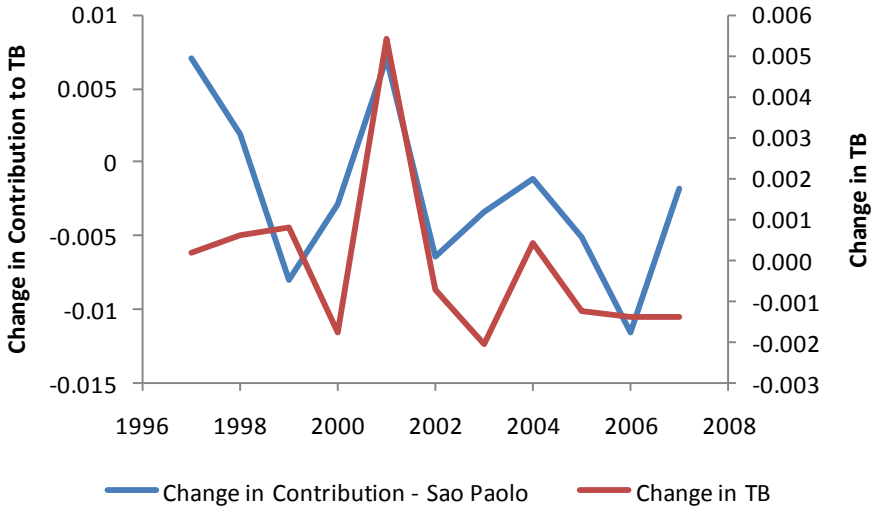
Figure 8-3. Year over Year Change in Buenos Aires City's Contributions to Between-Province Inequality



Source: Author's calculations, based on SIPA data.

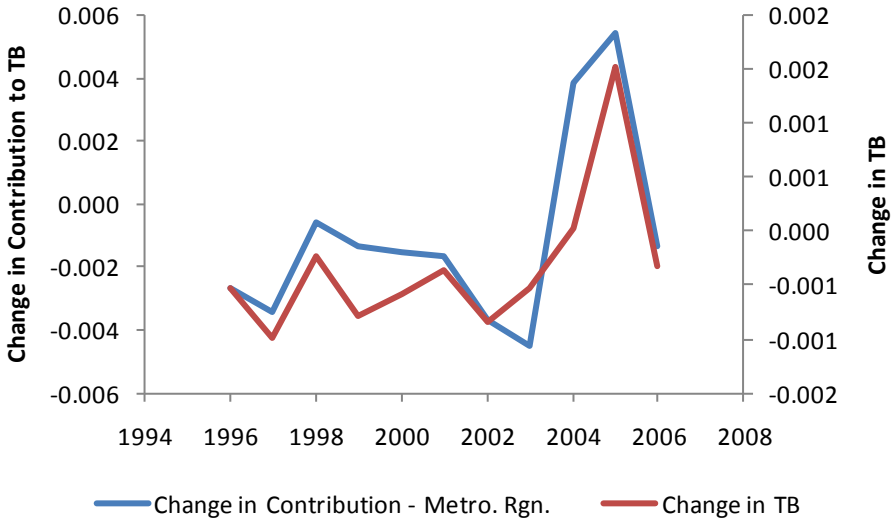
MECE grouping – geographic units in Figures 8-3 through 8-5 – and because changes in a single group's contributions produce similarly sized changes in the opposite direction from other geographic units, changes in the contributions of key components (such as the units containing major metropolitan centers presented in Figures 8-3 through 8-5) are larger than the changes in T^B they provoke.

Figure 8-4. Year over Year Change in Sao Paolo's (State) Contributions to Between-State Inequality



Source: Author's calculations, based on CEMPRE data.

Figure 8-5. Year over Year Change in Chilean Metropolitan Region's Contributions to Between-Region Inequality



Source: Author's calculations, based on SAFP data.

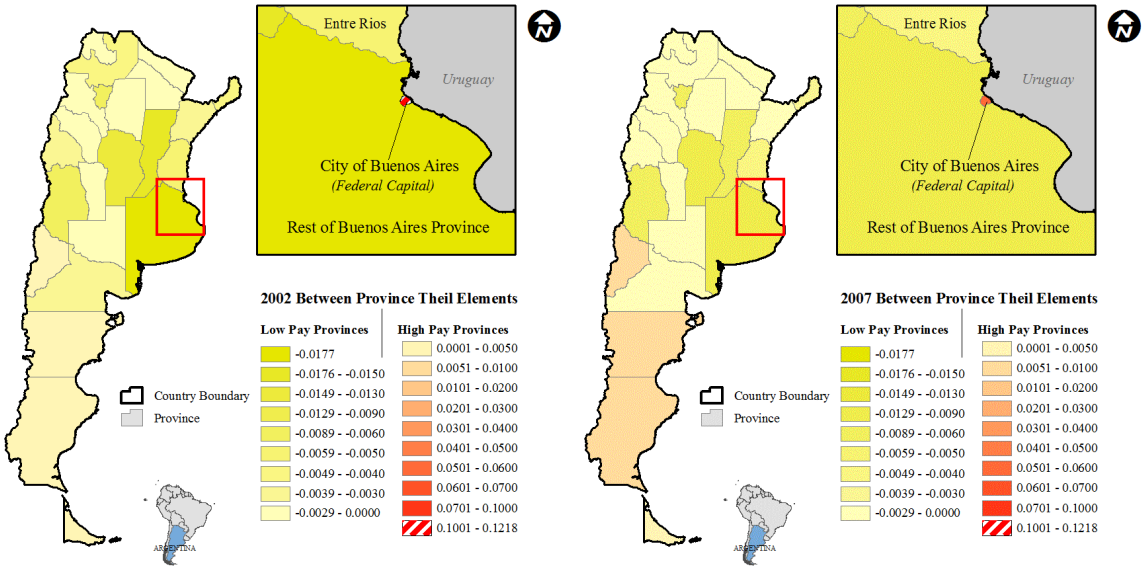
Figure 8-3 shows how Buenos Aires City drives the rise and fall in Argentine inter-geographic unit T^B over the period of study. Figure 8-4 shows that this

relationship is less strong for Sao Paulo and Brazilian between-geographic unit inequality (explained in no small part by the fact that Brazil has two additional important urban centers – the state of Rio de Janeiro and the Federal District), but still exists. Finally, Figure 8-5 shows a very close relationship between T^B geographic units for Chile and the contribution of its Metropolitan Region.

Changing Contributions of the High Pay Geographic Units

Figures 8-3 through 8-5 show the close relationship between changes in the contributions of the geographic units of the countries of study containing the major metropolitan centers and the total inequality between geographic units. They also show that changes in the contributions of the major metropolitan regions are mostly negative (Buenos Aires in the first half of the period being the exception): overall, their contributions to inequality are decreasing. These decreasing trends drive the overall decreasing trends in inequality between geographic units (again noting that the relationship is weakest in Brazil: while Sao Paulo's contributions are decreasing, its impact on inequality between regions is diminished by offsetting changes in the contributions from Rio de Janeiro and the Federal District). At the same time as overall inequality is decreasing, the contributions of other high pay geographic units of the countries of study become more prominent.

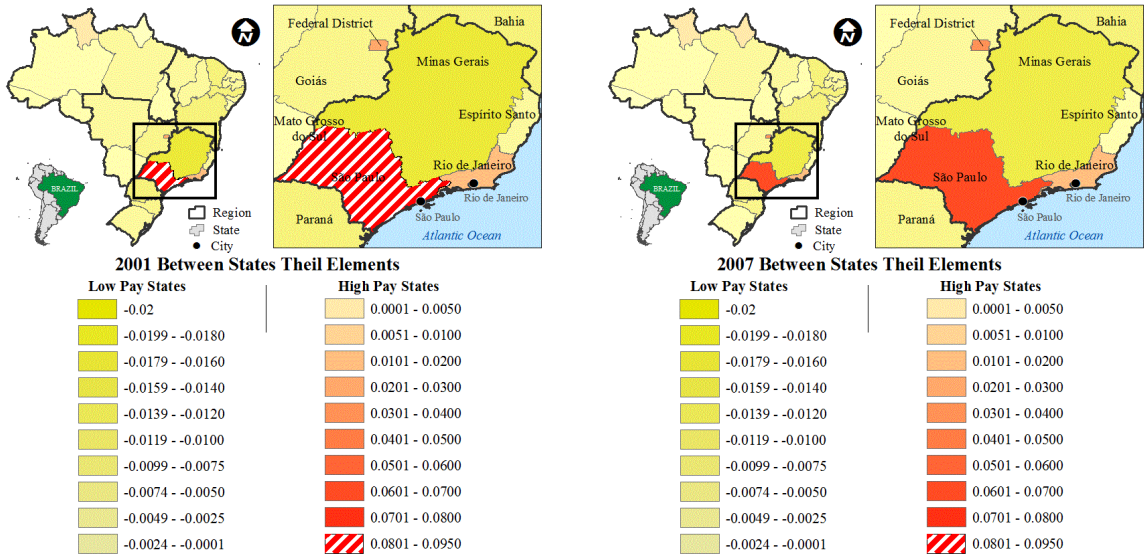
Figure 8-6. Geographic Inequality in Argentina, 2002 and 2007



Source: Author's calculations, based on SIPA data.

As the maps in Figure 8-6 show, the reduction in size of Buenos Aires City's contribution is opposed by an increase in the contributions from the extractive industry-rich Patagonian provinces.

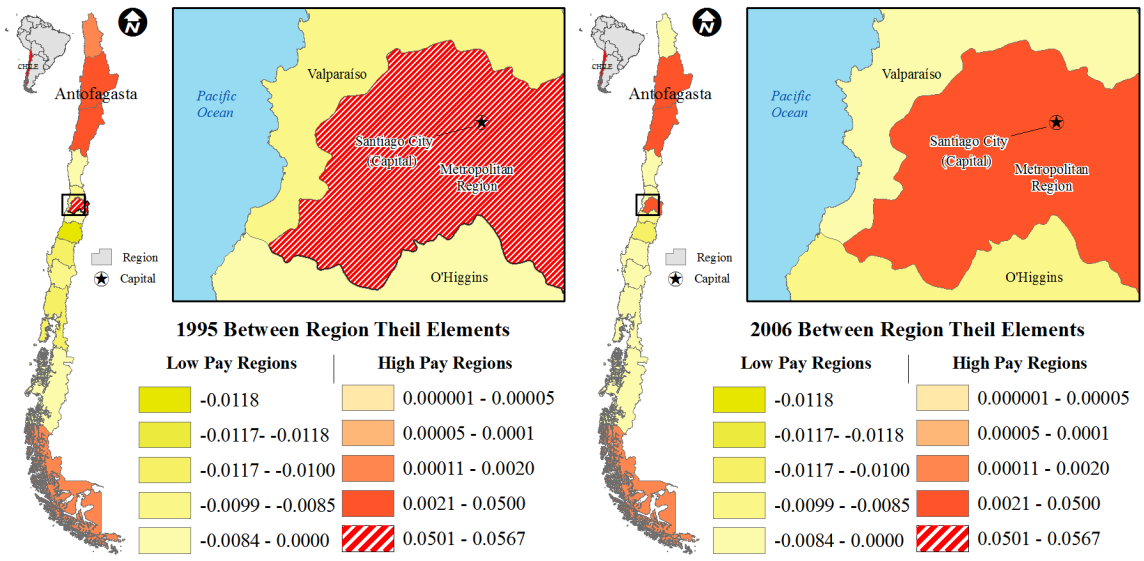
Figure 8-7. Geographic Inequality in Brazil, 2001 and 2007



Source: Author's calculations, based on CEMPRE data.

Figure 8-7 shows how the contribution of Sao Paulo decreases between 2001 and 2007, while that of the Federal District increases over the same period.

Figure 8-8. Geographic Inequality in Chile, 1995 and 2006



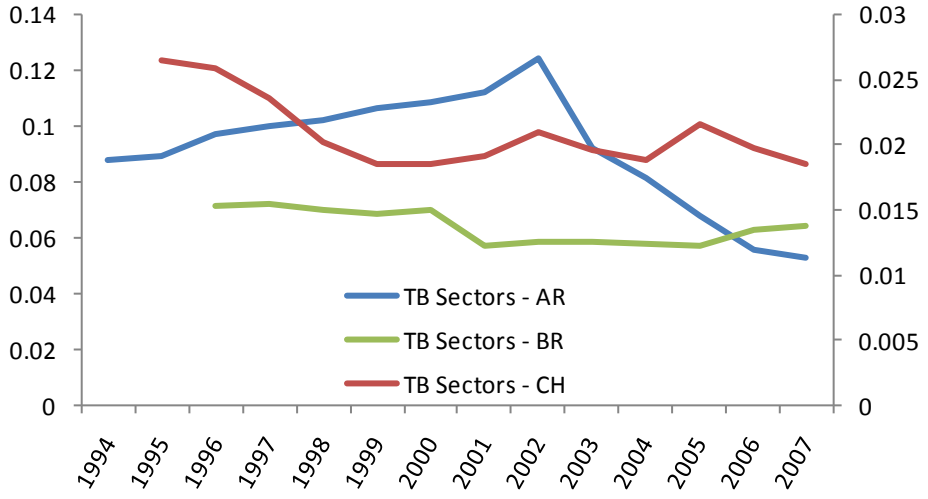
Source: Author's calculations, based on SAFP data.

The predominant feature of the maps in Figure 8-8 is the decrease in the contribution of the Metropolitan Region of Santiago.

SECTORAL ANALYSIS OF INEQUALITY IN COUNTRIES OF STUDY

Trends in inequality between sectors (T^B Sectors) are presented in Figure 8-9.[127]

Figure 8-9. Between Sectors Component of Theil's T: Argentina, Brazil, and Chile



Source: Author's calculations.

Inequality between sectors in Argentina follows a similar path to that of inequality between geographic units. In Brazil, inequality between sectors is relatively stable. A generally decreasing trend across the period of study is confounded by increases from 2005 to 2007: as discussed below, this is largely explained by increases in the contribution of the civil service sector. The overall

[127] As in Figure 8-2, Chile's between-sectors inequality is plotted on a secondary axis.

trend in Chile across the period is decreasing, as was inequality between geographic units.

Sectoral Structure of Inequality –High & Low Pay Sectors

In all three countries, the status of sectors is sticky: high wage sectors generally have high wages across the period of study, and low wage sectors generally remain low-wage. Across the three countries, Finance, Extractive Industry, and Civil Service are the big three high-pay sectors. After these, high-pay sectors generally include Transport, Storage, and Communications; Utilities, and Manufacturing.

Common themes run through the key low-pay sectors of the countries of study as well. Sectors making the largest contributions from below are those focused on provision of low-end services (e.g. Social Services and Public Health); Real Estate; Wholesale and Retail Trade; Agriculture; and Construction.

Dominant Components of Inequality between Sectors: Finance, Extractive Industry, Civil Service

While additional sectors may have played important roles in one country or another, changes in inequality between sectors in the three countries of study are heavily influenced by the contributions of three sectors: Finance, Extractive Industry (including both the mining of minerals and production of oil and gas), and Civil Service.[128] These sectors affect inequality in different ways: Finance and Mining by providing particularly high salaries to a relatively small number of

[128] As explained in the Data Chapter, the Argentine data only include a subset of public sector employees, the data do not include public sector employees of those provinces that did not transfer the administration of their employee benefits to SIPA.

people, and Civil Service by providing relatively high salaries to much larger groups of people.

The driving roles of these three sectors are demonstrated by Figures 8-10 through 8-15. Figures 8-10, 8-12, and 8-14 are representations of the inequality between two groups: one group is the big three sectors – Finance, Mining, and Civil Service – and the other grouping is all remaining sectors in the sectoral divisions of the respective countries. In each, the overall inequality is composed of the inequality between the two groups and the inequality within them. Figures 8-11, 8-13, and 8-15 show the relationship between the year-over-year changes in the contributions to between-sectoral inequality of these big 3 sectors and the changes in between-sectoral inequality in each of the countries of study.[129]

Broadly, the trends in the contributions of these sectors are similar: the contributions of extractive industry and the civil service sectors increase, particularly in the 2000s, while the contributions of the countries' financial sectors decrease (with the clear exception of Argentina between 1994 and 2002).[130]

A key feature of Figures 8-10, 8-12 and 8-14 is that they show how the big three sectors are driving the overall trends: inequality among the remaining sectors, represented by the red portion of the columns, exhibits little change in

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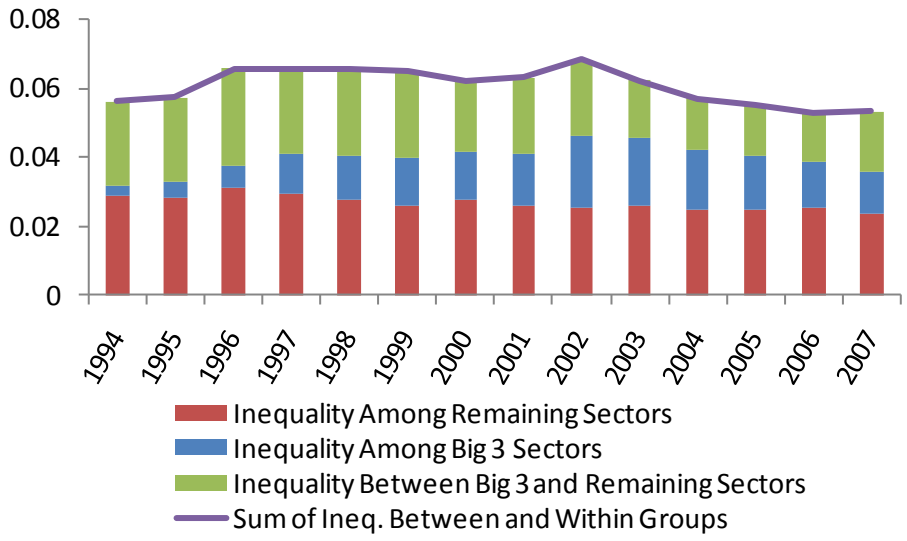
[129] As with Figures 8-3 through 8-5, the year over year change in T^B is represented by the red line in Figures 8-11, 8-13 and 8-15, on the right axis. The year over year change in the contributions of Finance, Mining, and Civil Service are presented on the left axis, represented by the stacked bars (positive changes stack above the 0 line, while negative changes stack below), and with the net impact of the changes in the three sectors represented by the blue line.

[130] In the case of Argentina, the type of data obtained limit the ability to observe increasing contributions from the Civil Service, but increasing salaries and employment in the Argentine public sector in the post-Convertibility period is well documented in other sources.

any of the countries of study. Much of change in overall inequality is driven by changes in the inequality between the big three sectors and the remaining sectors (represented the green portion of the columns in each graph): in those cases where the changes in the overall trend are not captured entirely by the changes in inequality between the "big three" sectors and the rest, what changes is the inequality among the big three (the blue portion of the columns), which reflects differentiation between the contributions of these three sectors.

Figure 8-10. Argentine Sectoral Inequality

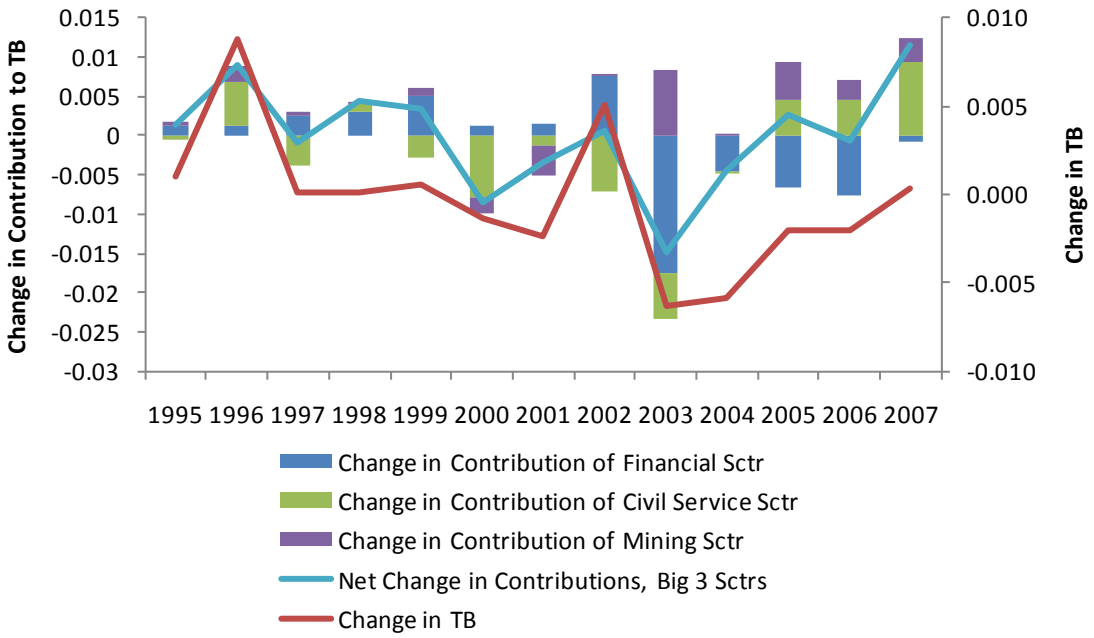


Source: Author's calculations, based on SIPA data.

Figure 8-10 clearly shows that the initial increase in inequality between sectors in 1995-96 was primarily a function of change in inequality between the big 3 sectors and the remaining sectors of the economy, and that as the inequality between the two groups erodes from 2002 to the end of the period (especially between 2002 and 2004), overall inequality also decreases. It also shows an

increase in the inequality among the big three sectors leading up to the crisis in 2002, followed by reductions in the inequality among these three sectors.

Figure 8-11. Year over Year Change in the Key Sectors' Contributions to Between-Sector Inequality in Argentina

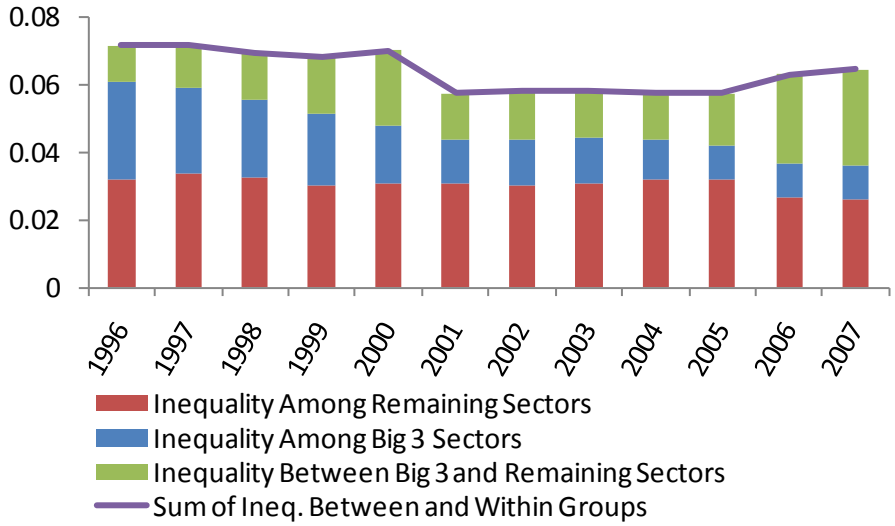


Source: Author's calculations, based on SIPA data.

Figure 8-11 breaks out the contributions of the big 3 sectors to Argentine between-sector inequality, highlighting the increasing contributions of Argentina's financial sector from 1995 to 2002, and its decreasing contributions after the 2002 crisis until the end of the period of study. It also shows how changes in the mining sector's contributions became larger and positive, after 2002. The relationship between the net change in contributions of these three high pay sectors and movements in T^B sectors is strong for most of the period: in years like 1996 and 2003, when there are significant changes in the net contribution of the three sectors, there are also large changes in T^B, in the same

direction. In years such as 1997, when the changes in the contributions of the three sectors cancel each other out, there is little or no change in T^B. In the later years, however, the driving relationship seems to break down: the decrease in T^B in 2004, almost equal to that of 2003, is not explained by the small net change in the contributions of the 3 sectors, and in 2007, a clear increase in the net contribution of the 3 sectors produces no change in T^B: the impacts of these three sectors is being offset by some other sector(s).

Figure 8-12. Brazilian Sectoral Inequality

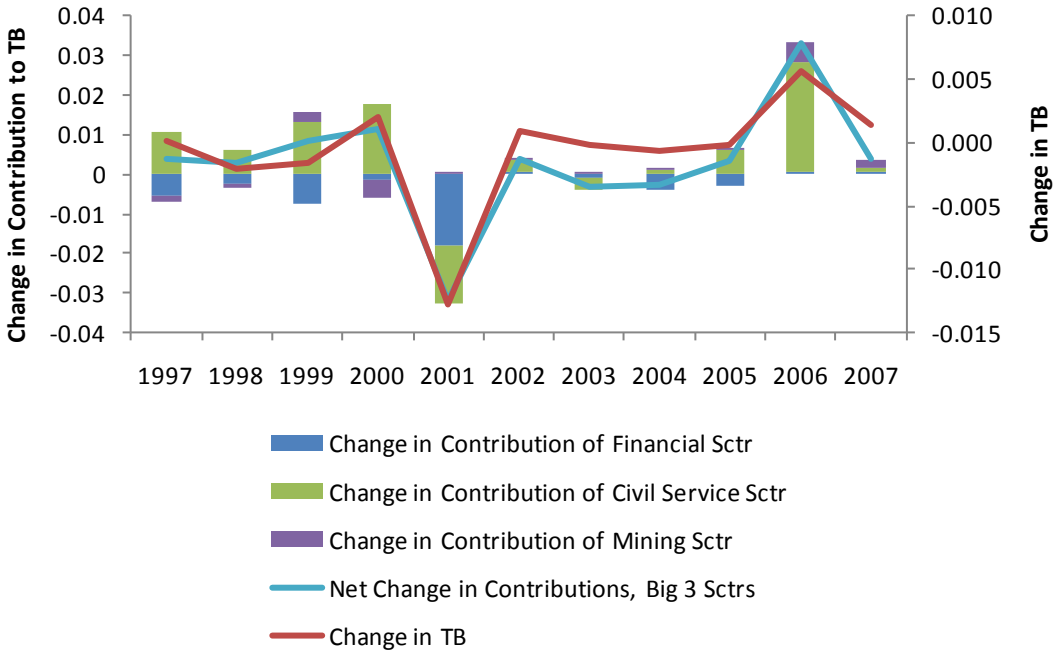


Source: Author's calculations, based on CEMPRE data.

Figure 8-12 shows that there is very little change in inequality among the sectors that are not the big three sectors, other than a drop between 2005 and 2006. A sizeable increase in the inequality between the big three sectors and the remaining sectors from 1996 to 2000 is offset by decreasing inequality among the big three sectors, such that total inequality in Figure 8-12 does not change much in those years. As can be seen in Figure 8-13, this is mostly a function of decline

of finance being offset by the rise of the civil service sector. The reduction in inequality between 2000 and 2001 is a reduction in the inequality between the big three sectors and the remaining sectors: this is a function of simultaneous reductions in the contributions of both finance and civil service. In 2006 and 2007, the inequality among both the big 3 and the remaining sectors group declines: the increases in inequality in those years is entirely a function of change in the inequality between these two groups. As Figure 8-13 shows, this is primarily a function of a surge in the contributions of the civil service sector, though the contributions of Brazil's mining sector also increase.

Figure 8-13. Year over Year Change in the Key Sectors' Contributions to Between-Sector Inequality in Brazil

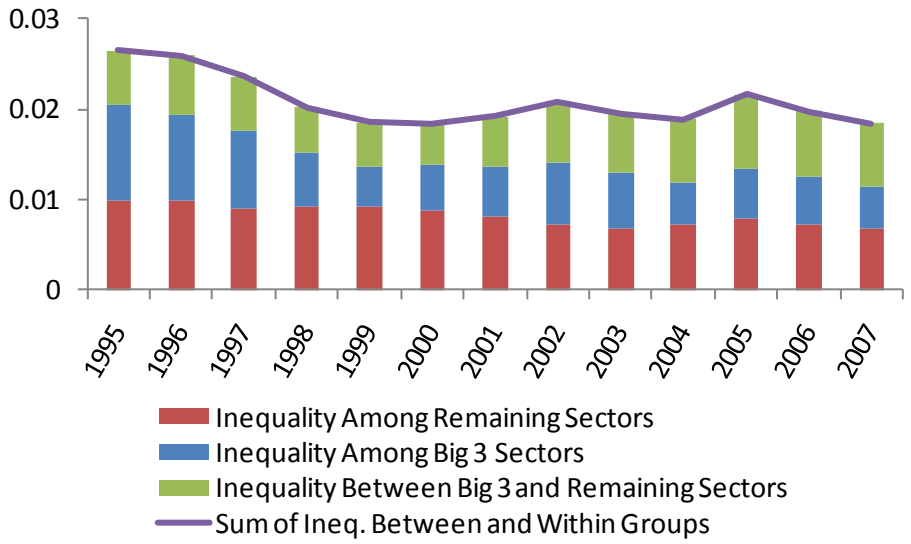


Source: Author's calculations, based on CEMPRE data.

The relationship between changes in inequality between sectors and changes in the net contributions of the three key sectors is quite strong across the

period of study for Brazil. As Figure 8-13 shows, the sector producing the largest changes in its contributions to Brazilian between-sector inequality is the Civil Service sector. Figure 8-13 also highlights how the contributions of Brazil's financial sector have been diminishing across the period of study.

Figure 8-14. Chilean Sectoral Inequality

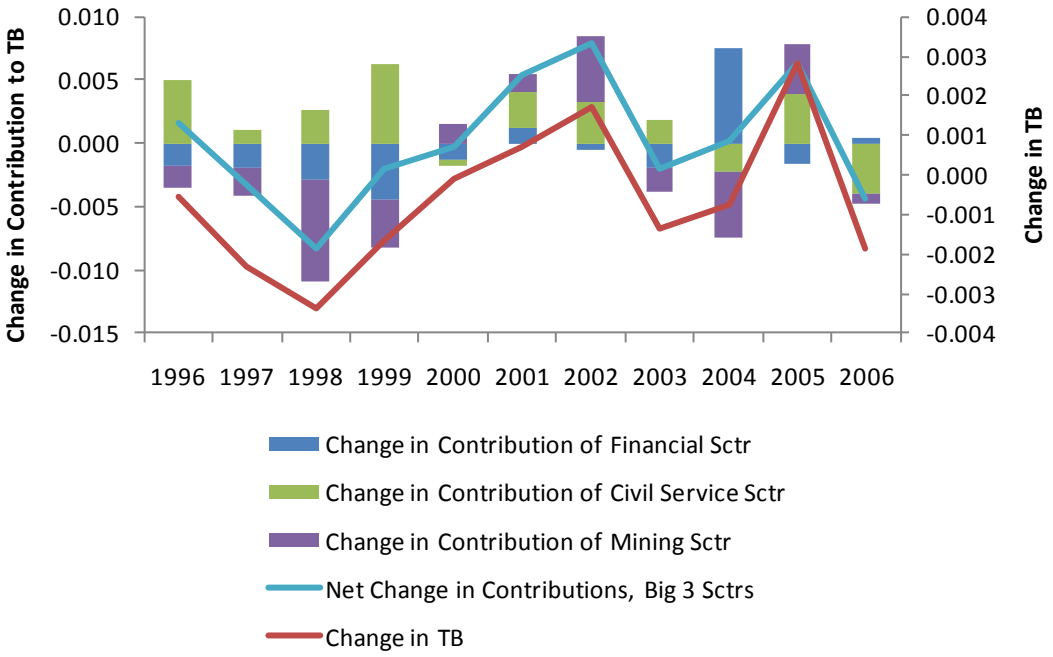


Source: Author's calculations, based on SAFP data.

As with Argentina and Brazil, inequality among the remaining sectors in Chile fluctuates some, but is not a key feature of the changes in sectoral inequality observed across the period, as seen in Figure 8-14. Unlike Argentina and Brazil, however, the inequality between Chile's big three sectors and the remaining sectors does not appear to drive the trend, though it plays a role in 2005. In Chile, inequality among the big three sectors appears to be responsible for a large portion of the overall change, most clearly in the rundown in inequality from 1995 to 2000, but in reality throughout the period. Figure 8-15 demonstrates how the contributions of the big three sectors are frequently

moving in opposite directions in Chile, which explains, at least in part why the observed changes in inequality in Figure 8-14 are frequently concentrated in the inequality among the big three sectors.

Figure 8-15. Year over Year Change in the Key Sectors' Contributions to Between-Sector Inequality in Chile



Source: Author's calculations, based on SAFP data.

Changes in inequality between sectors in Chile essentially mirror the net change in the contributions of the three key sectors across the period of study. As inequality between sectors was decreasing in Chile in the last half of the 1990s, the contributions of both Finance and Mining were also decreasing, though these decreasing contributions were somewhat offset by increasing contributions from the Civil Service sector. When the change in inequality between sectors was positive – in 2001, 2002, and 2005 – the net change in the three sectors' contributions was also positive.

RELATIONSHIP BETWEEN SECTORAL AND GEOGRAPHIC FINDINGS

A clear relationship exists between the fortunes of each country's financial sectors and those of the principal metropolitan areas (Sao Paulo state, home of Sao Paulo's City, Buenos Aires City, and the Metropolitan Region of Santiago, home of Santiago's City) home of the financial sectors of their respective countries.

Similarly, there is a clear relationship between the increasing contributions of each country's extractive industries (oil, gas, mining) to sectoral inequality and the increasing contributions to geographical inequality made by high pay geographical units where there is a concentration of activity in extractive industries: in Argentina (southern region), Brazil (Rio de Janeiro), and Chile (northern regions).

Finally, increasing contributions from above by the Civil Service sector to sectoral inequality is also reflected in the changing contributions to geographic inequality from the countries of study. The role of the public sector is most obvious in Brazil, where the city of Brasilia – a city built for the explicit purpose of public administration - has emerged as a major contributor to geographic inequality. The trend in sectoral inequality in Chile reveals an increasing role of the public sector across the period of study. It is difficult to comment on changes in the public administration sector in Argentina, due to the limitations imposed by the data available for that country.

RELATIONSHIP BETWEEN DRIVERS OF ECONOMIC INEQUALITY AND MACROECONOMIC EVENTS

Macroeconomic Context to the Period of Study

Broadly, Table 8-1 presents the principal institutional and macroeconomic determinants that divide the period of study in two distinct macroeconomic contexts: one that begins in the early 1990s and runs until the early 2000s, and another that begins in the early years of the 2000s and runs until today. A detailed analysis of these contexts and the differences between each country exceeds the scope of this dissertation.

Table 8-1. Institutional and Macroeconomic Determinants of the Period of Study

	The 1990s and the Washington Consensus[131]	**The 2000s and the Post Washington Consensus**
Role of the State	Pro-market nature of implemented reforms diminished the role of the State, ultimately damaging the markets themselves.	The State increases its involvement in the economy, including recovery of its role as regulator and arbiter of national economies. Policies remain decidedly pro-market, but with much stronger controls in place.
Financial	Liberalization without	Remain open, but with

[131] Macroeconomic policies implemented in the region in the early 1990s broadly fall under the umbrella of the Washington Consensus, though implemented in varying degrees in the countries of study.

	The 1990s and the Washington Consensus[131]	**The 2000s and the Post Washington Consensus**
Liberalization	regulation. "Financial liberalization was just as aggressive—with direct credit controls abandoned, interest rates deregulated, foreign direct investment regimes opened, and foreign exchange and capital account controls dismantled" (Birdsall and De La Torre 2001, p.6).	regulation. Capital inflows are still welcomed, but with regulations in the financial market to slow the "velocity" of the investment capital coming in (if not the amount coming in, the speed with which it could be withdrawn). Most importantly, capital inflows are not used to finance deficits in the current accounts.
Exchange Rates	Fixed exchange rates or "pegged floating" exchange rates, with appreciation of local currencies and negative impacts on the competitiveness of domestic production.	Competitive exchange rates, boosting external competitiveness, favoring domestic production and exports.
Trade Liberalization	In context of unfavorable exchange rates, trade liberalization damaged domestic productive	In context of more competitive exchange rates, relative prices favor exports. Increased demand for domestic goods,

	The 1990s and the Washington Consensus[131]	**The 2000s and the Post Washington Consensus**
	apparatus.	especially from Asia (particularly China) and improved prices in world commodity markets.
Unions	Unions weakened.	Re-emergence of unions.
Labor market institutions	Marginal role: minimum wages, collective bargaining, etc.	Re-emergence of labor market institutions: clear increases in minimum wages and increases in collective bargaining.
Labor Markets Indicators	Increasing unemployment, informality, and precariousness of employment.	Decreasing unemployment and informality.
Social Welfare	Lack of compensatory policies, marginalization of social policy.	Expansion of social safety network through compensatory policies and targeted social policies.
Fiscal and Current Accounts	Fiscal and trade deficits.	Fiscal and trade surpluses.
Debt	Increasing external debts.	Improved management of foreign debt.
Privatization	Privatization of state-owned	Re-nationalization or more

	The 1990s and the Washington Consensus[131]	The 2000s and the Post Washington Consensus
	enterprises and out-sourcing of functions previously performed by the State.	State control exerted over provision of public services.

Source: Author.

Broadly, the 1990s can be characterized as a period of implementation of pro-market reforms. Overall the results were disappointing, not only in terms of economic growth, but also in the performance of indicators in the labor market, all of which led to increases in poverty and inequality.

In contrast, the second period has been a period of economic bonanza, with the stimulus of an exchange rate that was substantially more favorable (for export-based sectors) and a strong increase in commodity prices. Argentina, Brazil, and Chile have experienced high levels of average economic growth in the 2000s, a strong increase in employment (accompanied by general improvement of the other indicators of the labor market), current account and fiscal surpluses, and, consequently, a boost in foreign reserves. All of this has produced decreasing poverty and inequality in this second period.

Link between Macroeconomic Context and Sectoral and Geographic Drivers

As discussed at length in this chapter, this dissertation has identified that three sectors – Finance, Extractive Industry and Civil Service – played a protagonistic role in driving the changes in inequality that took place in Argentina, Chile, and Brazil, respectively, during the period of study. This dissertation has shown that the financial sector played a decisive role in

explaining the evolution of inequality in Argentina during the period of study. At the same time, extractive industry played the same role in the Chilean case, while the Civil Service sector had great impact on changing inequality dynamics in Brazil. Geographically, key roles are played by major metropolitan centers (home of the financial sectors in these countries), and areas whose economies rely on extractive industries or, in the case of Brasilia, whose economies revolve around public administration. The macroeconomic context provided in the previous section, combined with an understanding of the different ways in which the three countries articulated their relationships with the world economy and the principle aspects of their public policy across the period of study, allows the observed results from the three countries of study to be integrated into a coherent picture. The following three sections provide a broad overview of how the three identified sectors were influenced by macroeconomic events in the countries of study. To develop a complete understanding would require in-depth country by country analysis, which is outside the scope of this dissertation.

Financial Sector

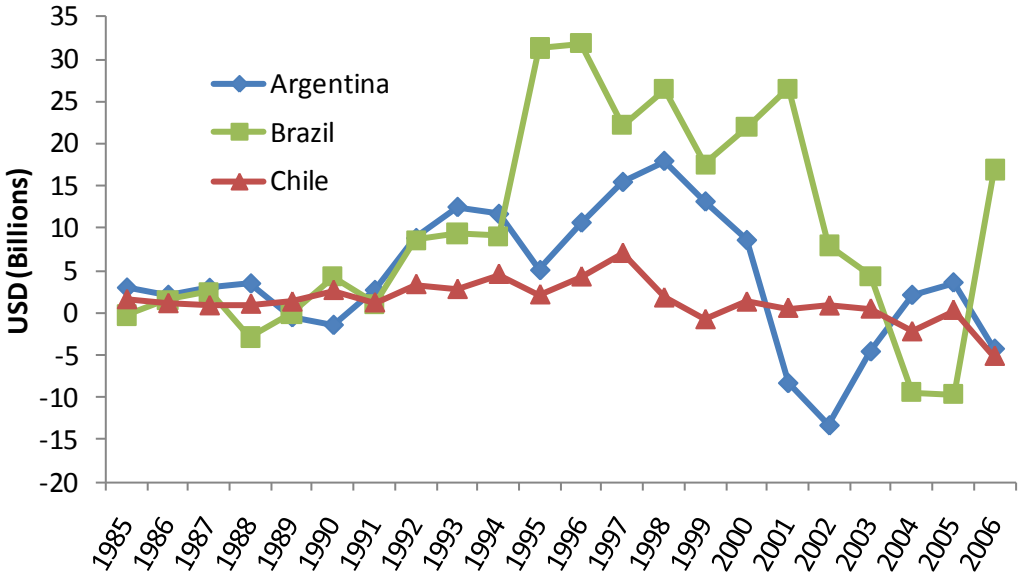
To understand the relationship between the performance of the countries of study's financial sectors and the underlying macroeconomic context requires going back in time to the beginning of the 1990s, and, specifically, what Bresser-Pereira and Varela call the "Second Washington Consensus:" a recommendation of financial liberalization to stimulate growth in emerging economies.[132] In the

[132] These authors distinguish between the "first Washington Consensus," a package of recommendations including structural adjustments and market-oriented reforms in the 1980s but, importantly, not including financial opening, and the "second Washington Consensus," which called for opening of capital accounts once the countries had overcome their debt crises.

context of enormous liquidity in world markets, it seemed to make perfect sense: the recommendation from Washington was that "the highly indebted countries should open their capital accounts and resume economic growth by resorting to foreign savings" (Bresser-Pereira and Varela 2004-5, p.238).

The countries of study took different approaches to financial liberalization: all three opened their economies to capital inflows, but in ways that can be characterized from reasonably controlled (Chile) to moderate (Brazil) to somewhat indiscriminate (Argentina). After a decade in which capital inflows had been almost non-existent, the data show that capital inflows to Latin America took off in the early 1990s (Calvo, Leiderman *et al.* 1996; Griffith-Jones 2000; Galindo and Izquierdo 2002). Argentina, Brazil and Chile were no exceptions, as shown in Figure 8-16.

Figure 8-16. Net Capital Inflows, 1985 - 2006



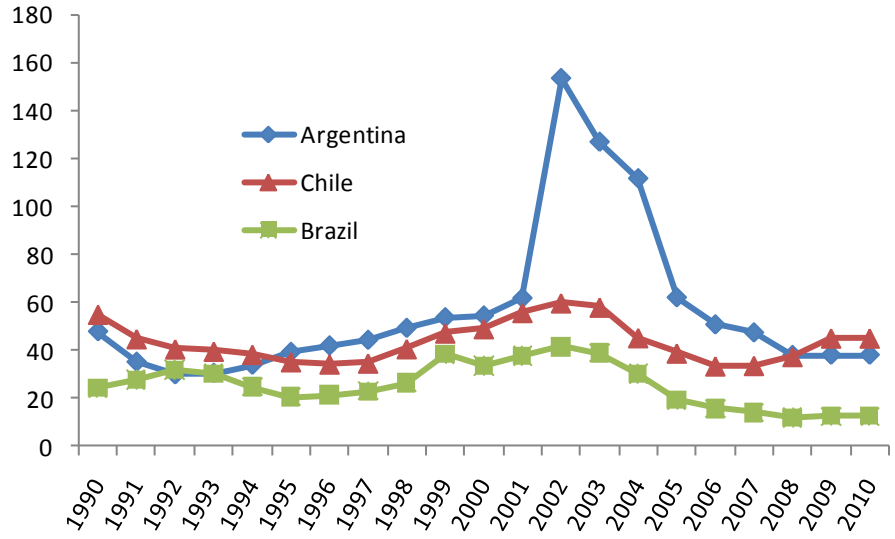
Source: CEPALSTAT.

Net capital inflows were low, and in some instances negative, for all three countries in the late 1980s and the beginning of the 1990s, after which Chilean net inflows grew slightly, and Argentine and Brazilian inflows took off.

For the countries of study, it is reasonable to expect that large increases in capital inflows would cause their respective financial sectors to grow. The Argentine case is clear: as discussed in the chapter on Argentina, the contribution of the financial sector to the gross geographic product (GGP) of Buenos Aires City doubled between 1994 and 2002. The growth in the Argentine financial sector is also observed in that sector's increasing contributions to Theil's T statistic between 1994 and 2002, driving increases in inequality in that country, even as capital inflows began to decrease after 1998. In Brazil and Chile, different phenomena are observed. Their financial sectors are key contributors to inequality, but their financial sectors' contributions do not grow in the time series presented for these two countries in this dissertation, which begin about the time the boom in capital inflows begins to recede. As Figure 8-16 shows, capital inflows peaked in Brazil in 1996, the first year for which the administrative data used to estimate Brazilian inequality in this dissertation were available. Figure 8-16 also reveals two important points about Chile: capital inflows never took off in that country to the extent they did for Argentina and Brazil, and, to the extent they did grow, they peaked in 1997 (the data series used to calculate inequality for Chile began in 1995). Chile's limited inflows, as compared to those of Argentina and Brazil, were due to the relative size of their economy and the restrictive approach they took to speculative capital flows, relying more on foreign direct investment.

The large capital inflows in Argentina and Brazil had the consequence of appreciating the local currencies and causing a considerable increase in the countries' current account deficits, leading these countries to again begin to accumulate large amounts of external debt.

Figure 8-17. External Debt as a Percentage of GDP, 1990 - 2010



Source: ECLAC.

The countries' accumulation of debt (shown in Figure 8-17 as a percentage of GDP) and increasing current account deficits were "sustainable" as long as capital inflows continued. However, beginning with the Asian crisis in 1997, and worsened by the Russian crisis of 1998, capital inflows to emerging economies – including the countries of study – slowed considerably, not to return to the region until the early to mid-2000s.

As explained by Galindo and Izquierdo (2002), this interruption caused many countries to modify their exchange rate regimes. In the specific case of Brazil and Chile, "pegged float" exchange rates (in which currency could adjust

within a small band around the target rate) were abandoned in favor of floating exchange rates in 1999. By contrast, Argentina maintained its currency board (fixed exchange rate) arrangement for two more years, which it would not abandon until forced to do so by the crisis of December 2001. Adjusting exchange rates cannot be done without consequence: according to the authors, Argentina's choice to maintain its exchange rate despite the decrease in capital inflows, was due to the perception that the costs of changing its real exchange rate were much greater than those faced by Brazil and Chile because Argentina was in the worst position – it had the largest current account deficit and the greatest foreign debt. In summary, Argentina's was the most dramatic case, characterized by broad adoption of the "growth cum foreign savings" model (formulation of Bresser-Pereira and Varela 2004-5) and reforms in local financial system promoted by the Argentine Central Bank. These included policies oriented to the compulsory use of banks, expanded access to credit, and significant growth of the financial sector, as evidenced by a great increase in the number of banks (both domestic and foreign) and financial intermediaries in the country.

The reforms implemented, combined with the response of domestic and international banks, created persistent deficits in the current accounts, and led to the accumulation of massive foreign debt. Due to the extreme nature of these imbalances, the Convertibility Plan was not abandoned when the crises of Asia and Russia occurred in the late 1990s, which only worsened the situation – both foreign debt and the current account deficit continued accumulating – ultimately becoming untenable and exploding into the crisis of 2001.

The crisis greatly diminished the role of the financial sector in the Argentine economy. Banks and financial intermediaries were eliminated: foreign banks withdrew and banks around the country were closed after merger and acquisition activity, which rapidly reduced the availability of credit.

Brazil's is a similar case, only less extreme. Like Argentina, Brazil also adopted the "growth cum foreign savings" model. However, Brazil experimented with different exchange rate regimes across the 1990s, with the Plan Real implementing a fixed exchange rate between 1994 and 1999. Nevertheless, Brazil incurred current accounts deficits and accumulated foreign debt, leading to two balance of payments crises –in 1998 and 2002 – after both of which they devalued the Real (in 1999, and again in 2002).

Chile took a different approach. It was the only country that imposed controls on capital inflows in the 1990s (the mechanism was the URR – unremunerated reserve requirements), allowing them to avoid balance of payments crises and "assuring satisfactory growth rates" as compared to Argentina and Brazil (Bresser-Pereira and Varela 2004-5, p.237). Nevertheless, with the onset of the crises in Asia and Russia, Chile also went into recession between 1997 and 1998; however, they did not experience the magnitude of the currency and banking crises that Argentina and Brazil did. Like Brazil, Chile opted to modify its exchange rate regime, adopting a floating exchange rate in 1999.

Broadly, this characterization of the three countries relates major macroeconomic events at the local and global level with the different performances of the countries of study's financial sectors. Furthermore, it also

explains how the unfolding of events (reversal of capital inflows and recessions, which were followed by major crises in Brazil and Argentina) led these countries to modify their development strategies, particularly their insertion in the global economy, by implementing post-neoliberal policies at the local level.

Extractive Industry

Extractive Industry has increased its contributions to inequality in Argentina, Brazil, and Chile in the period of study, especially since the early 2000s, as described both in previous sections of this chapter and in the country-specific chapters. Argentina, Brazil, and Chile are all rich in mineral resources, the exploitation of which has accelerated in recent years. Metallic mining – of minerals like gold, silver, and copper - occurs in all three countries. Additionally, Argentina and Brazil have strong and growing "energy mineral" (petroleum) sectors. Brazil and Chile are home to two of the 25 highest-producing mining companies, in terms of the value of their production (state-owned National Copper Corporation of Chile (CODELCO). CODELCO in Chile, and the privately-owned mining company -CVRD[133]- in Brazil). The growing importance of the mining sector to the Brazilian economy is reflected in the growth of CVRD: after acquiring Canada's INCO in 2006, Brazil's largest private mining company was thought to be the largest producer of metallic minerals in the world (UNCTAD 2007, p. xxii). While Argentina does not have a single company, the growing importance of mining to the Argentine economy is reflected in the government's decision, in 2003, to create a cabinet-level position (Secretary of Mining) for the development and administration of the sector. The sector's

[133] CVRD stands for Companhia Vale do Rio Doce.

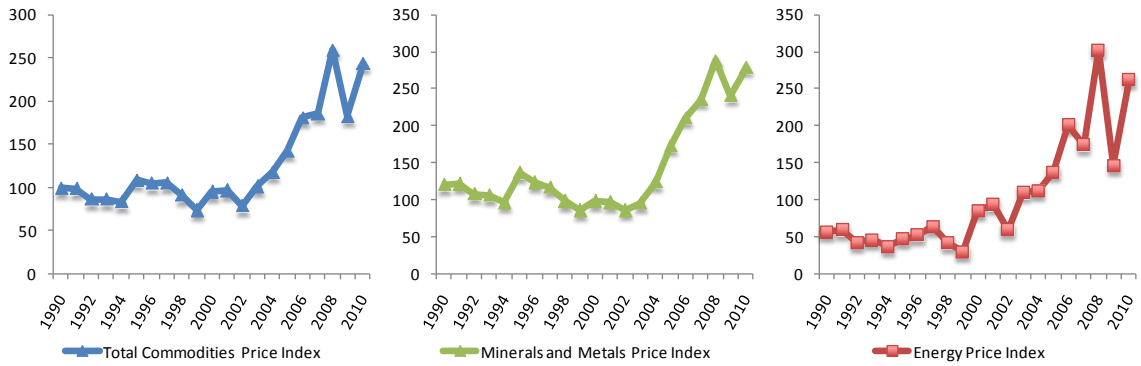
growth is reflected in the following growth statistics between the years 2003 and 2008 (Secretaría de Minería 2009):

- Investments: mining-sector investments grew by 1,014 percent from 660 million pesos to 7,350 pesos.
- Exports: exports grew by 275 percent, from 3.3 billion pesos to 12.4 billion pesos
- Production: total production grew by 292 percent, from 4 billion to 16.7 billion pesos.

While all three countries have significant extractive industry, Chile's mining sector is the most critical to its economy. Chile ranks as one of the world developing economies with highest dependence on mineral exports: fully 45 percent of Chile's total exports between 2000 and 2004 were copper (UNCTAD 2007, p.87).

Globally, demand for a wide range of commodities has been rapidly increasing in recent years, driven in no small part by increased demand from China, India and other developing countries.

Figure 8-18. Key Commodity Price Indices, 1990 – 2010[134]



Source: ECLAC.

As shown in Figure 8-18, the commodity price boom that started around 2002 as a result of increasing competition for the limited supplies of these commodities led to increased global and local (national) investment in extractives industries. The 2007 World Investment Report mentions the major minerals (both metallic and energy) produced by the countries of study in a succinct statement describing the global commodity boom (UNCTAD 2007, p.81):

> Rising demand for mineral resources from fast-growing markets in Asia has added to the persistent high levels of demand in developed countries, leading to a surge in mineral prices. In 2006, the price of crude oil reaches a level 10 times higher than its lowest point in 1998. Price increases have also occurred in metals such as aluminum, copper, nickel and zinc, and by June 2007 they were far higher than the levels prevailing in 2003. As a result, corporate profits in the extractive industries have soared and international investments have rebounded.

The importance of China in driving these trends cannot be understated. China's explosive growth over the past decade has been particularly resource-intensive,

[134] The Minerals and Metals Price Index includes copper, iron, steel (products), aluminum, silver, zinc, tin, lead, and gold. The Energy Price Index includes crude oil, gasoline, natural gas, and coal. In addition to Energy and Minerals and Metals, the Commodity Price Index contains an array of food and other agricultural (raw materials, such as cotton) commodities.

to the point that in 2005 growth in its demand for oil, copper, and nickel was responsible for 29 percent, 66 percent, and 25 percent, respectively, of the growth in world demand for these commodities (UNCTAD 2007, p. 89).

Civil Service

A key feature of the 2000s in Latin America has been the reassertion of role of the State in directing national economies.[135] As such, the increasing importance of the civil service sector observed in the inequality trends of the countries of study in the 2000s can be considered both cause and consequence of the economic growth these countries have experienced.

This growth directly contrasts with prior experience: the transition from the ISI model to the pro-market designs of the 1980s and 1990s was characterized by a dismantling of the state apparatus. The period of study includes a time in which Argentina privatized a number of state enterprises, which brought about significantly decreased employment in the public sector. Similar privatizations began much earlier in Chile, as early as the mid-1970s, such that by the 1990s privatizations had slowed: this explains, in part, why contributions to sectoral inequality from Chile's public sector did not diminish in the first half of the period of study.

As the States sought to re-establish themselves for the new context of the 21st century, they had to re-configure, building new capacities and recovering old ones, a process that required investment in their respective civil services. The enhanced role the States took on included new institutional design of public

[135] Macdonald and Ruckert (2010) provide a detailed discussion of the ways in which the Argentine and Brazilian states have re-asserted themselves in the economic realm in the post-neoliberal period.

enterprises, greater intervention in the domestic economy (from macroeconomic policies, generally, to targeted social policies), policies of strategic investment, and foreign trade development, among others. As an example of strategic investment, policies favoring the expansion of the extractive industries have been implemented: these have the added advantage of providing additional tax revenues with which to finance State operations.

POLICY IMPLICATIONS

Increased integration of national economies with the world economy brings heightened importance to how countries choose to manage their relationships with the rest of the world. At the same time, the economic growth of the last decade has brought greater complexity to the development and implementation of internal public policies. The experiences of Argentina, Brazil, and Chile during the period of study provide a good basis for policy recommendations. While one-size-fits-all proposals are not appropriate - different public policies may be appropriate for different countries given the existence of different local (national) and international contexts – some broad insights are instructive.

Broadly, selected policies should retain two key objectives: (1) foment appropriate levels of economic growth, though not just any growth, and not at any cost; and (2) build on the achievements of the past decade in achieving macroeconomic stability and long-term consistency, avoiding volatility and potential for recessive impacts.

Perspectives from the Sectoral Analysis

In particular, the cases of the three sectors highlighted in this chapter provide specific insight into how policy has affected economic performance, which in turn drove the vast majority of changes in inequality in the period of study.

Financial Sector

In the period of study, an episode of significant growth in Argentina's financial sector was observed. This growth coincided with a time of high levels of liquidity in the world financial system and the implementation of public policies oriented more towards the needs of Argentina's capital markets than the country itself. These policies followed from the misguided belief that increased capital flows without regulations and disconnected from the real economy would necessarily lead to economic growth. Policy makers must recognize that what is good for the financial sector is not necessarily what is good for the overall economy. As Lavagna (2003, p.74) put it:

> …the greatest damages, in terms of growth, but above all in terms of development with equality, are produced in periods of high international liquidity, when financial capital flows are greatest….it is precisely during these periods (which can be characterized as bubbles) that the greatest errors in economic policies have been committed (author's translation).

As it turned out, the large increase in the importance of the Argentine financial sector was an artifact of a major bubble. Given this experience, and the contrast between Argentina's experience and those of Brazil and Chile, what appropriate policy measures might there be to reduce the risk of instability derived from the financial sector? Two recommendations can be made based on the relative

performance of the economies of the countries of study in the late 1990s and early 2000s:

1. Small and medium-sized developing economies should take a more skeptical attitude towards speculative capital inflows, and policies should be implemented that reconnect the financial sector to the real economy. Recommendations could include the imposition of more regulation on speculative flows, such as imposing limits on the withdrawal of invested capital. Focusing international capital on longer-term direct investment enhances the connection of financial capital to the real economy.
2. National policies with respect to capital inflows need to be designed with a country's economic conditions in mind. As proposed by Bresser-Pereira and Varela (2004-5), capital inflows should be welcomed only when certain conditions are met: when foreign debt is being managed well and reasonably-established thresholds of foreign indebtedness are not being exceeded; and when they do not lead to overvaluation of the local exchange rate. Appreciation of local currency reduces domestic savings and investment and upsets the balance of payments, which, as observed in Brazil in the late 1990s and Argentina in 2001, will eventually lead to crisis. As the authors also point out, favorable conditions for countries to accept capital inflows exist when the opportunities to invest are large, such that domestic investment is not crowded out, and when interest rates are low.

Extractive Industry

From a purely economic perspective, opportunities in the mining of natural resources are generally attractive: it brings both direct and indirect investment and employment. For the State, mining brings tax revenue. While mining achieves a number of desirable economic goals, it also provokes environmental concerns –the environmental community has been vocal in expressing concerns about mining practices in all three countries. The benefits must be balanced with costs, ideally by requiring the mining companies to internalize as many of the costs (e.g. environmental costs) as possible. Strong state oversight through the implementation of strong regulatory frameworks is fundamental.

It should be noted that economic development centered around extractive industry is subject to the volatility of prices in the global market, which could fall if current trends in global demand were to reverse. Of the countries of study, Chile remains the most vulnerable to such a shock because of the heavy dependence on copper mining.[136] For this reason, Chile would benefit from policies to diversify the productive structure of its economy.

Finally, the benefits that a country can derive from investment and growth in its mining sector are related to the judicial use of revenues the State derives from taxing this development. Here Chile again is an example, as it accomplished an important objective with the revenues it derives from the exploitation of its mines: macroeconomic stabilization. Chile invested in a "Copper Fund," from which it deployed significant resources in response to the

[136] Copper is responsible for about eight percent of Chilean GDP. Taxation of copper has produced between 5 and 17 percent of Chile's total tax revenue in recent years (Ley 2010, p. 16).

world financial crisis of 2007-08 to minimize impacts on the Chilean population. Natural Resource Funds (NRFs), like the Chilean Copper Fund, make great sense for countries that derive large shares of their tax revenues from exploitation of their natural resources, as they allow for this kind of implementation of counter-cyclical policies. As described by Ley (2010), they can be deployed for macroeconomic stabilization, budget financing, and savings and investment.

Civil Service

Increasing inequality due to increasing contributions from the civil service sectors of the countries of study is a unique and relevant phenomenon. From the perspective of the methods applied in this dissertation, large contributions to inequality from above from a sector that provides above-average wages to a large number of people are preferable to large contributions from a sector that provides exorbitant wages to a very small number of people. Furthermore, if contributions from above can be had from a sector that does not promote instability (e.g. finance) or depend for its good fortune on factors such as global commodity prices (e.g. extractive industry) over which the State has no control, this should also be considered a good thing. The State has a relevant role in defining public policies to sustain long-term growth, in refereeing the choices between development options for economic expansion, and in the formulation of consistent policies to promote fairness and attend to equity concerns. Managing the complexity of the growth of an economy like that of Brazil, considered one of the 10 principle economies of the world, in a country with over 200 million people, requires a stable and effective bureaucracy, qualified technical staff, and proven management capability. Unfortunately, the civil service sector is not

generally considered a 'productive' sector, and the employment it generates is often evaluated simply as a function of the public expense it requires.

As experienced in the countries of study in the years predating the period of study under the import substitution model, too much dependence on the state apparatus produces inefficiency. However, markets need effective regulation to function properly, so a reasonable objective in design of the civil service would be to have a competent, well-paid professional bureaucracy that performs its duties with maximum efficiency.

LIMITATIONS OF THIS STUDY

There are three characteristics of this analysis that delimit its scope. While these choices facilitated the development of insights that might otherwise not have been available, these intrinsic characteristics do impose certain bounds on the scope of this study.

- Target Population: salaried workers in this dissertation include only the salaried workers that are formally-employed. By definition, informally-employed salaried workers are excluded from this study.
- Income Source: only income derived from wages is included, leaving out all other potential sources of income. This is a study of pay inequality, not income inequality.
- Semi-Aggregated Data: this dissertation uses aggregated data. As such, changes in observed inequality cannot be related to individual characteristics such as educational attainment.

Additionally, a few limitations were imposed on this study by the availability of data:

- Limited Period of Study: the data sets used do not extend back to the beginning of the 1990s, which would have permitted a more complete analysis of the impacts of implementation of the neoliberal model in the countries of study.
- Comparability of Results: To make a valid comparison among the three countries would have required a carefully-constructed data set that was not available for this study. Instead, the data sets used are

administrative data sets developed independent of each other by agencies of the respective governments of each country. As a result, sectoral classifications differ from country to country. Furthermore, countries divide their territories into different groupings. Different numbers of economic sectors and geographic jurisdictions in each country make it impossible to compare the inequality estimates obtained in each of the countries of study with the chosen measure: calculated values of Theil's T statistic are only comparable when they are performed for populations divided into an equal number of groups.

FURTHER RESEARCH

Opportunities for further research abound. One clear possibility is to expand the analysis by working with microdata from household surveys. In general, the scope of study could be expanded to include:

- More layers of data available at the sectoral and geographical level (e.g. municipalities for Argentina)
- The informally employed. Not only would this allow for incorporation of the informally employed to the overall calculations, it would also allow the population to be divided into the formally and informally salaried employed, allowing for comparison.
- Another interesting comparison that could be developed is the role of unions in determining inequality outcomes. The population could be divided in three groups of salaried workers: (1) formally employed

union members, (2) formally employed but non-union, and (3) the informally employed.

As mentioned throughout this chapter, in-depth development of the specific relationships between individual countries and global and local macroeconomic events was outside the scope of this study. As such, it is important to note that single country studies could be performed that would deepen the connections made between major macroeconomic events of the period of study and outcomes in a given country.

Finally, in the last few years the world has experienced the largest macroeconomic shock since the Great Depression. This dissertation's analysis ends in 2007, just before the US financial crisis set in and began to ripple through the world economy. Given the considerably better positions in which the countries of study found themselves immediately preceding the onset of this crisis as compared to their position at the end of the 1990s, it would be interesting to compare the impacts of this crisis on the countries of study to those of the Asian and Russian crises of the late 1990s.

References

Birdsall, Nancy and Augusto De La Torre. 2001. "Washington Contentious: Economic Policies for Social Equity in Latin America." Carnegie Endowment for International Peace and Inter-American Dialogue, Washington, D.C.

Bresser-Pereira, Luiz Carlos and Carmen Augusta Varela. 2004-5. "The Second Washington Consensus and Latin America's Quasi-Stagnation." *Journal of Post Keynesian Economics* 27(2):231-250.

Calvo, Guillermo A., Leonardo Leiderman, and Carmen M. Reinhart. 1996. "Inflows of Capital to Developing Countries in the 1990s." *Journal of Economic Perspectives* 10(2):123-139.

Galindo, Arturo and Alejandro Izquierdo. 2002. "Interrupciones súbitas en los flujos de capitales y estrategias cambiarias en Latinoamérica." *Revista Asturiana de Economía* 24.

Griffith-Jones, Stephany. 2000. "International Capital Flows to Latin America." Economic Reforms Series No. 55, ECLAC, Santiago, Chile.

Lavagna, Roberto. 2003. " Cuestiones macroeconómicas." *Archivos del Presente* 31:73-80.

Ley, Eduardo. 2010. "Exhaustible Resources and Fiscal Policy: Copper Mining in Zambia." ID Paper No. 77, The Centre for the Study of African Economies (CSAE) Conference 2010, Oxford.

Macdonald, Laura and Arne Ruckert. Fall 2010. "The post-neoliberal mix: new state practices in Latin America's big three." *Canada Watch*.

Secretaría de Minería. 2009. "Minería en números." Ministerio de Planificacion Federal, Inversion Pública y Servicios, Buenos Aires, Argentina.

UNCTAD. 2007. "World Investment Report 2007: Transnational Corporations Extractive Industries and Development." United Nations Conference on Trade and Development, Geneva, Switzerland.

Appendices

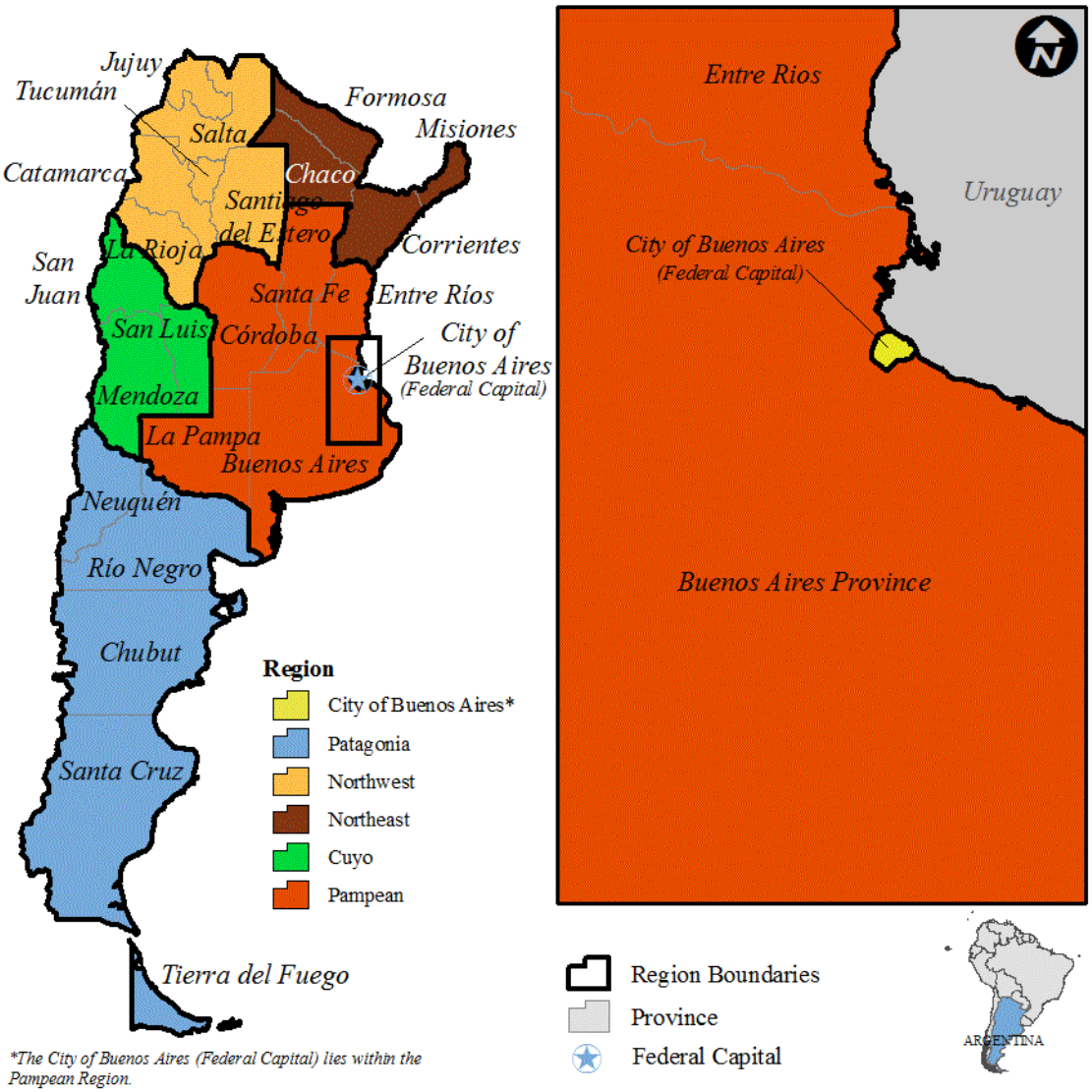
APPENDIX A. INTRODUCTION

Figure A-1. Dissertation's Geographic Coverage (Argentina, Brazil and Chile)

Source: Author, using data from the CIA World Factbook.

APPENDIX B. ARGENTINA

Figure B-1. Regions and Provinces of Argentina



Source: Author.

Table B-1. Argentine Exports by Jurisdiction in 2007

2007	Total		Primary Goods		MAO		MIO		Fuels	
	FOB in millions of US Dollars									
Total, Argentina	**55,980**	**100%**	**12,485**	**100%**	**19,214**	**100%**	**17,333**	**100%**	**6,949**	**100%**
Buenos Aires Province	20,768	37%	3,163	25%	4,054	21%	10,593	61%	2,958	43%
Catamarca	1,627	3%	1,508	12%	27	0%	92	1%	-	
Chaco	293	1%	220	2%	64	0%	9	0%	-	
Chubut	1,652	3%	288	2%	220	1%	497	3%	648	9%
Buenos Aires City	361	1%	--		145	1%	216	1%	--	
Córdoba	6,719	12%	2,401	19%	2,902	15%	1,415	8%	1	0%
Corrientes	137	0%	90	1%	28	0%	11	0%	8	0%
Entre Rios	1,241	2%	773	6%	332	2%	88	1%	47	1%
Formosa	31	0%	9	0%	7	0%	2	0%	12	0%
Jujuy	276	0%	163	1%	49	0%	64	0%	-	
La Pampa	226	0%	183	1%	25	0%	6	0%	12	0%
La Rioja	164	0%	1	0%	95	0%	67	0%	-	
Mendoza	1,347	2%	235	2%	735	4%	169	1%	207	3%
Misiones	434	1%	73	1%	217	1%	144	1%	--	
Neuquén	685	1%	53	0%	39	0%	14	0%	579	8%
Rio Negro	482	1%	326	3%	79	0%	27	0%	51	1%
Salta	1,047	2%	416	3%	101	1%	78	0%	453	7%
San Juan	742	1%	101	1%	181	1%	459	3%	1	0%
San Luis	507	1%	35	0%	180	1%	291	2%	-	
Santa Cruz	798	1%	256	2%	51	0%	173	1%	318	5%
Santa Fe	12,567	22%	1,461	12%	9,144	48%	1,573	9%	389	6%
Santiago del Estero	271	0%	247	2%	1	0%	23	0%	-	
Tierra del Fuego	456	1%	43	0%	42	0%	84	0%	287	4%
Tucumán	757	1%	317	3%	167	1%	270	2%	3	0%
Continental Shelf	83	0%	-		-		-		83	1%
Foreign	804	1%	2	0%	14	0%	761	4%	28	0%
Indeterminate	1,506	3%	120	1%	315	2%	207	1%	864	12%

Source: INDEC.

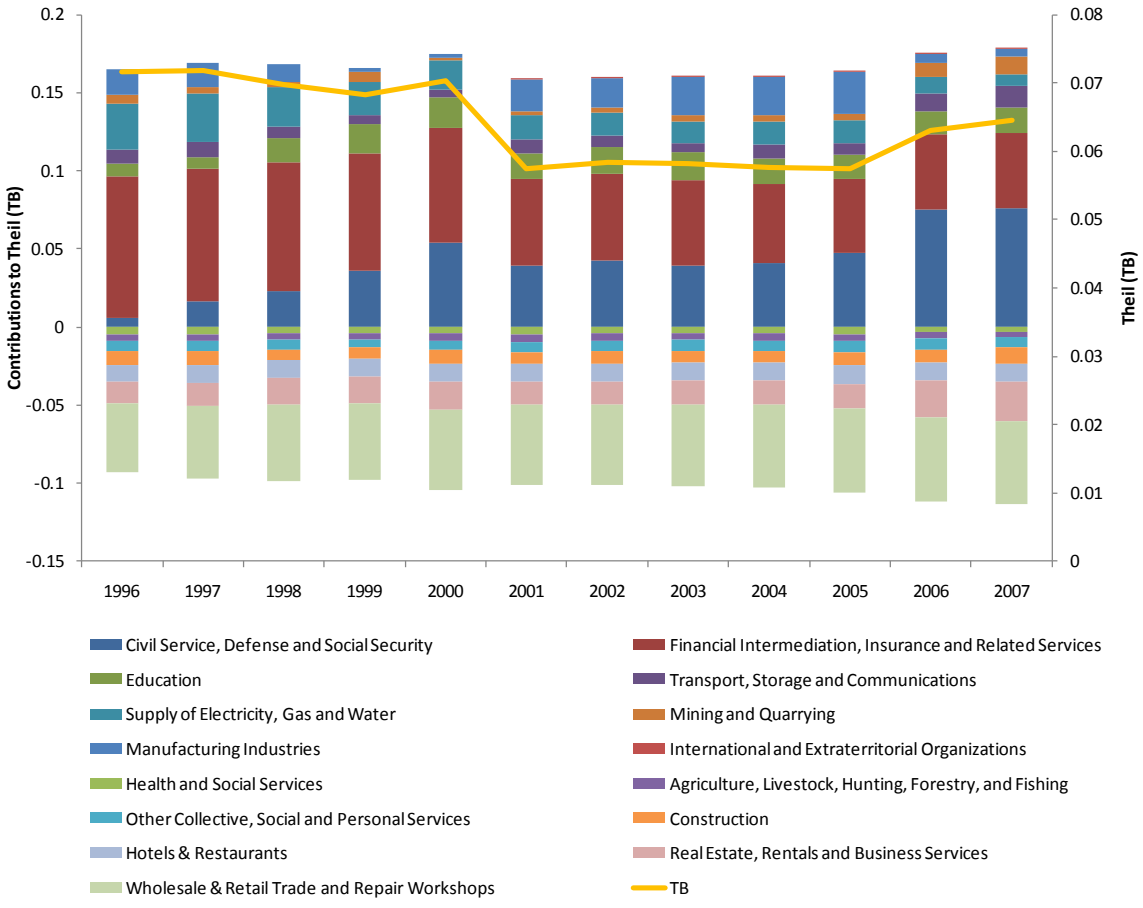
Table B-2. Argentine Population by Geographic Jurisdiction (2001/2010)

	2001 Census	2010 Census	Percent change
Total	36,260,130	40,091,359	10.6%
Buenos Aires City	2,776,138	2,891,082	4.1%
Buenos Aires Province	13,827,203	15,594,428	12.8%
Catamarca	334,568	367,820	9.9%
Córdoba	3,066,801	3,304,825	7.8%
Corrientes	930,991	993,338	6.7%
Chaco	984,446	1,053,466	7.0%
Chubut	413,237	506,668	22.6%
Entre Ríos	1,158,147	1,236,300	6.7%
Formosa	486,559	527,895	8.5%
Jujuy	611,888	672,260	9.9%
La Pampa	299,294	316,940	5.9%
La Rioja	289,983	331,847	14.4%
Mendoza	1,579,651	1,741,610	10.3%
Misiones	965,522	1,097,829	13.7%
Neuquén	474,155	550,344	16.1%
Río Negro	552,822	633,374	14.6%
Salta	1,079,051	1,215,207	12.6%
San Juan	620,023	680,427	9.7%
San Luis	367,933	431,588	17.3%
Santa Cruz	196,958	272,524	38.4%
Santa Fe	3,000,701	3,200,736	6.7%
Santiago del Estero	804,457	896,461	11.4%
Tierra del Fuego	101,079	126,190	24.8%
Tucumán	1,338,523	1,448,200	8.2%

Source: INDEC.

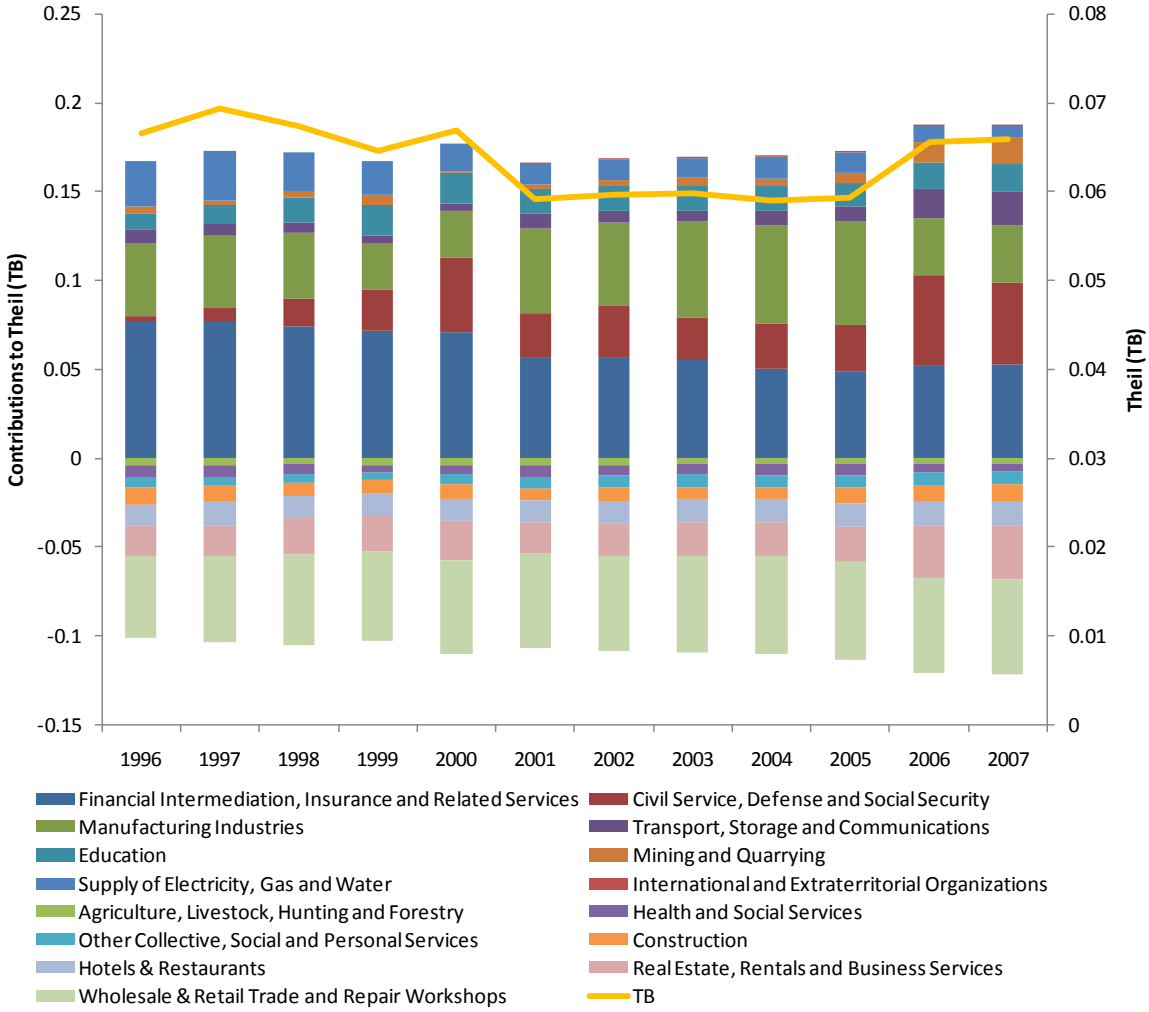
APPENDIX C. BRAZIL

Figure C-1. Brazilian Between-Sector Inequality with Employment Shares Fixed to 1996 Levels, 1996 - 2007



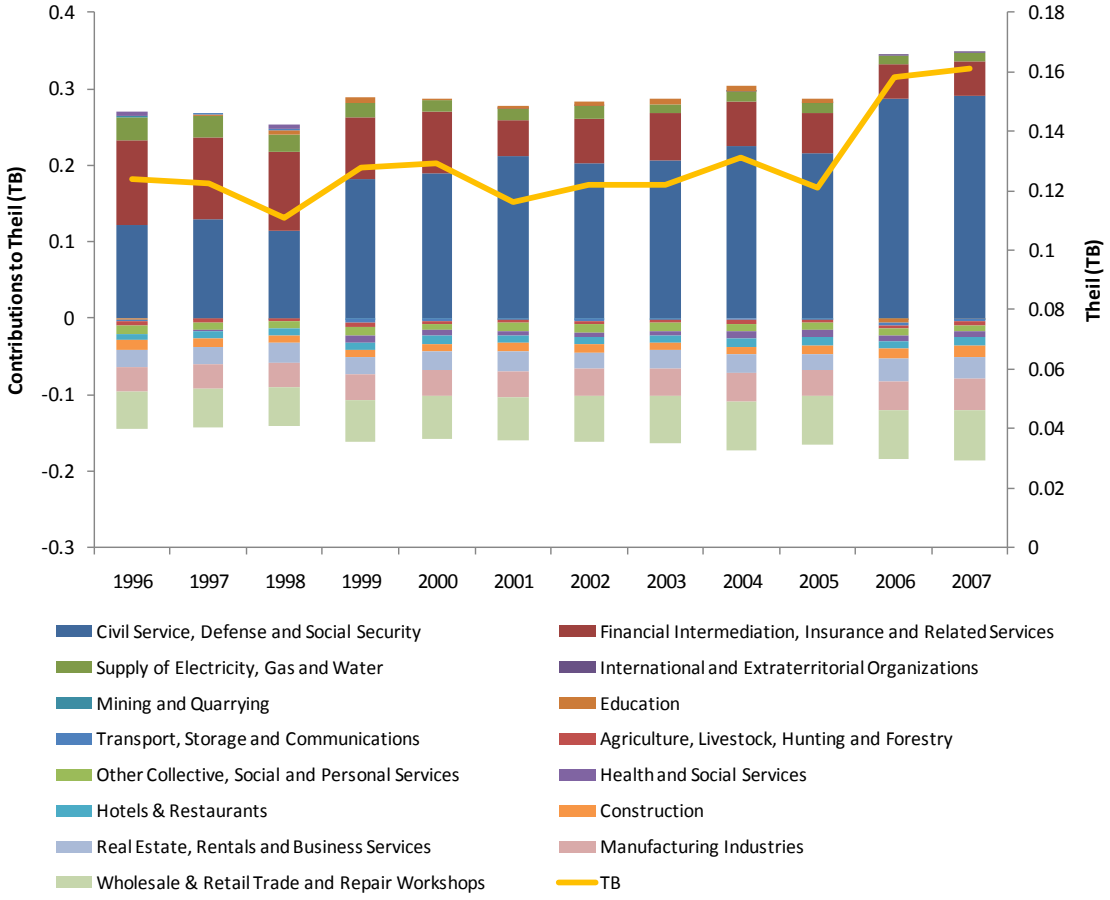
Source: Author's calculation based on CEMPRE data.

Figure C-2. Inequality between Sectors within the Southeast Region



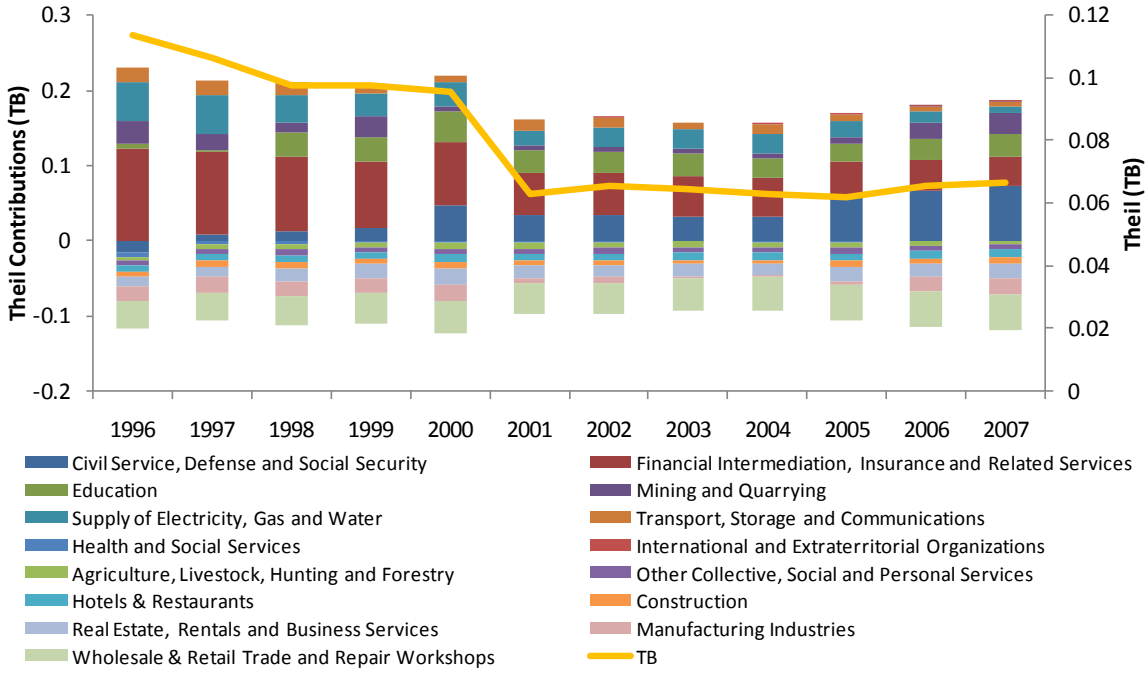
Source: Author's calculation based on CEMPRE data.

Figure C-3. Inequality between Sectors within the Center-West Region



Source: Author's calculation based on CEMPRE data.

Figure C-4. Inequality between Sectors within the Northeast Region



Source: Author's calculation based on CEMPRE data.

Table C-1. Share of Brazilian Regions and States in Gross Domestic Product -1996-2007

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
BRAZIL	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
NORTH	**4.3**	**4.1**	**4.2**	**4.2**	**4.4**	**4.5**	**4.7**	**4.8**	**4.9**	**5.0**	**5.1**	**5.0**
Rondonia	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Acre	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Amazonas	1.5	1.3	1.3	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.7	1.6
Roraima	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
Pará	1.6	1.5	1.5	1.5	1.6	1.7	1.7	1.8	1.8	1.8	1.9	1.9
Amapa	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Tocantins	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
NORTHEAST	**12.5**	**12.5**	**12.4**	**12.4**	**12.4**	**12.6**	**13.0**	**12.8**	**12.7**	**13.1**	**13.1**	**13.1**
Maranhao	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.2
Piaui	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Ceará	2.0	2.0	2.0	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.0	1.9
Rio Gde Norte	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9
Paraiba	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Pernambuco	2.4	2.3	2.4	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.3	2.3
Alagoas	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Sergipe	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Bahia	3.8	3.9	3.9	3.9	3.9	3.9	4.1	4.0	4.1	4.2	4.1	4.1
SOUTHEAST	**58.4**	**58.5**	**58.2**	**58.2**	**58.3**	**57.7**	**56.7**	**55.8**	**55.8**	**56.5**	**56.8**	**56.4**
Minas Gerais	8.8	8.8	8.6	8.4	8.5	8.5	8.6	8.8	9.1	9.0	9.1	9.1
Espiritu Santo	1.9	1.9	1.9	1.9	2.0	1.9	1.8	1.8	2.1	2.2	2.2	2.3
Rio de Janeiro	11.2	11.1	11.7	11.9	11.8	11.7	11.6	11.1	11.5	11.5	11.6	11.2
São Paulo	36.5	36.7	36.1	36.0	36.0	35.6	34.6	34.1	33.1	33.9	33.9	33.9
SOUTH	**16.2**	**16.1**	**16.2**	**16.4**	**16.5**	**16.7**	**16.9**	**17.7**	**17.4**	**16.6**	**16.3**	**16.6**
Paraná	5.7	5.6	5.8	6.0	5.9	5.9	6.0	6.4	6.3	5.9	5.8	6.1
Santa Catarina	3.5	3.5	3.5	3.5	3.7	3.7	3.8	3.9	4.0	4.0	3.9	3.9

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Rio Gde do Sul	7.0	6.9	6.9	6.9	6.9	7.1	7.1	7.3	7.1	6.7	6.6	6.6
CENTER-WEST	**8.6**	**8.8**	**9.0**	**8.8**	**8.4**	**8.5**	**8.8**	**9.0**	**9.1**	**8.9**	**8.7**	**8.9**
Mato Grosso do Sul	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.1
Mato Grosso	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.6	1.9	1.7	1.5	1.6
Goiás	2.1	2.1	2.2	2.1	2.2	2.3	2.5	2.5	2.5	2.4	2.4	2.5
Federal District	4.6	4.7	4.8	4.6	3.9	4.0	3.8	3.7	3.6	3.8	3.8	3.8

Source: IBGE.

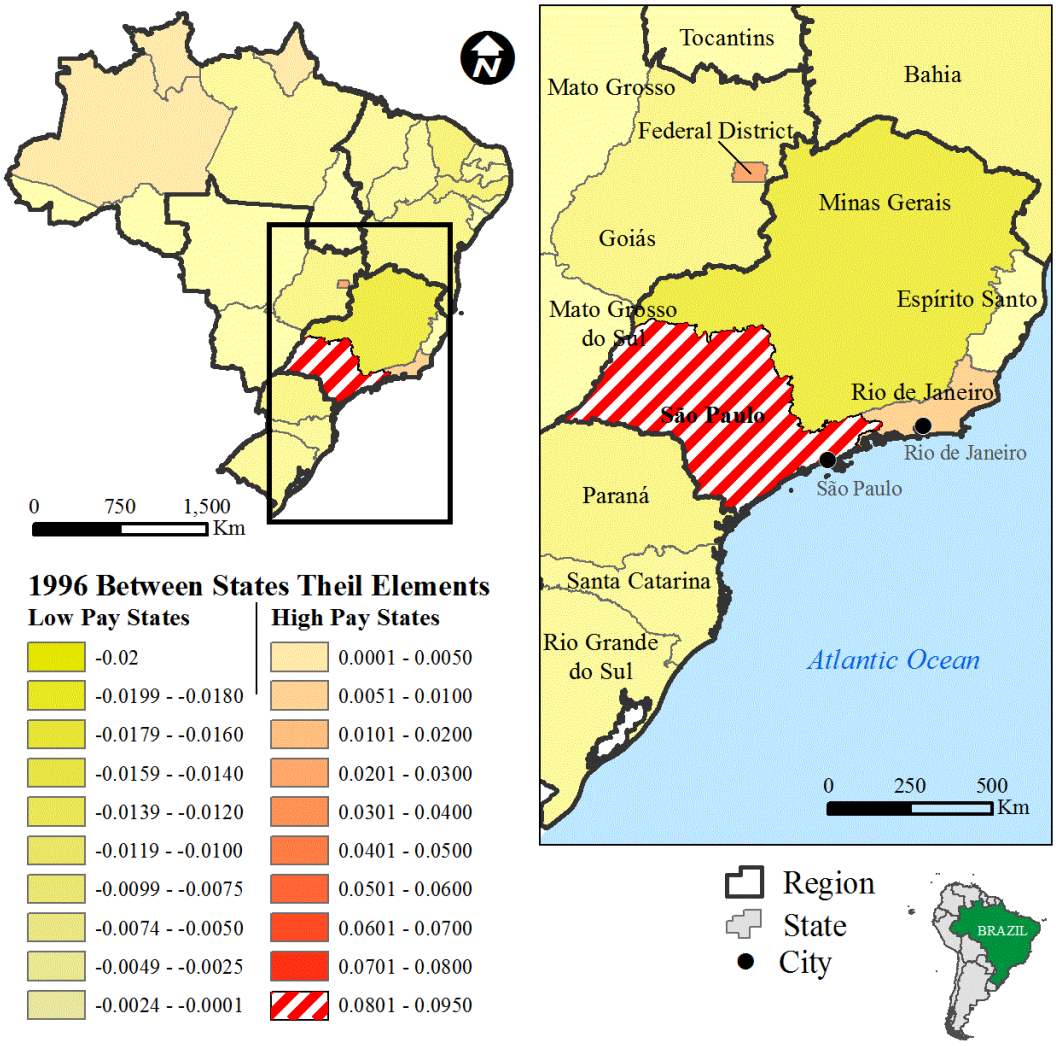
Table C-2. Share of National Employment in Finance

State	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Acre	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Alagoas	1%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Amapa	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Amazonas	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Bahia	4%	4%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Ceara	2%	2%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Federal District	**4%**	**3%**	**10%**	**3%**	**4%**	**4%**	**4%**	**4%**	**5%**	**5%**	**5%**	**5%**
Espirito Santo	2%	2%	1%	2%	2%	2%	1%	1%	2%	2%	2%	2%
Goias	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Maranhao	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Mato Grosso	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Mato Grosso Sul	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Minas Gerais	8%	8%	7%	7%	8%	8%	8%	8%	8%	8%	7%	8%
Para	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	1%	1%
Paraiba	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Parana	8%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	5%
Pernambuco	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Piaui	1%	0%	0%	1%	1%	1%	0%	0%	0%	1%	1%	1%

State	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Rio de Janeiro	**13%**	**13%**	**13%**	**13%**	**12%**	**13%**	**12%**	**13%**	**12%**	**12%**	**12%**	**11%**
Rio Gde Norte	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Rio Gde Sul	7%	7%	7%	6%	7%	7%	7%	7%	7%	6%	8%	8%
Rondonia	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Roraima	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Santa Catarina	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	4%	3%
Sao Paulo	**38%**	**40%**	**38%**	**42%**	**41%**	**41%**	**41%**	**40%**	**40%**	**40%**	**39%**	**41%**
Sergipe	1%	1%	1%	1%	1%	0%	1%	1%	1%	1%	1%	1%
Tocantins	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

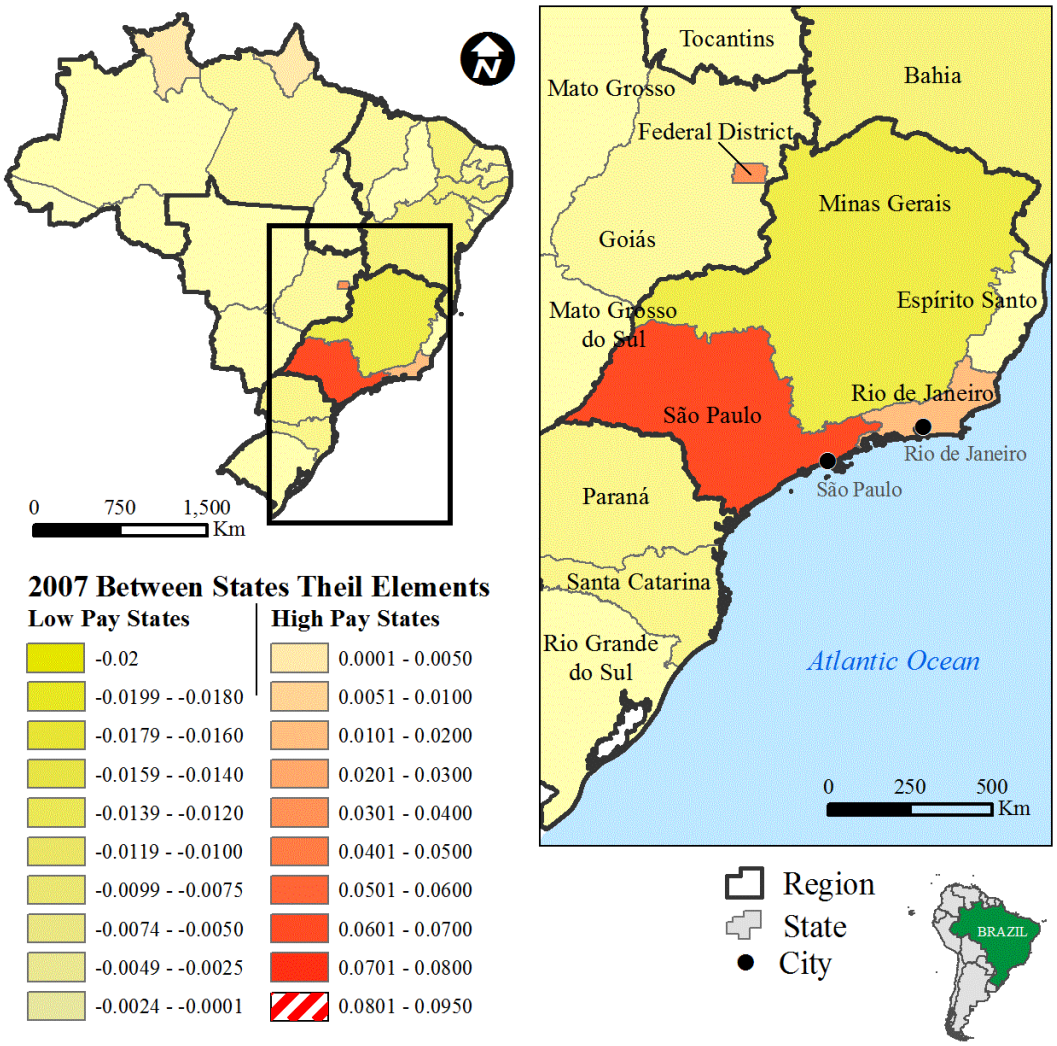
Source: Author's calculation based on CEMPRE data.

Figure C-5. Contributions to the Inequality between States (1996)



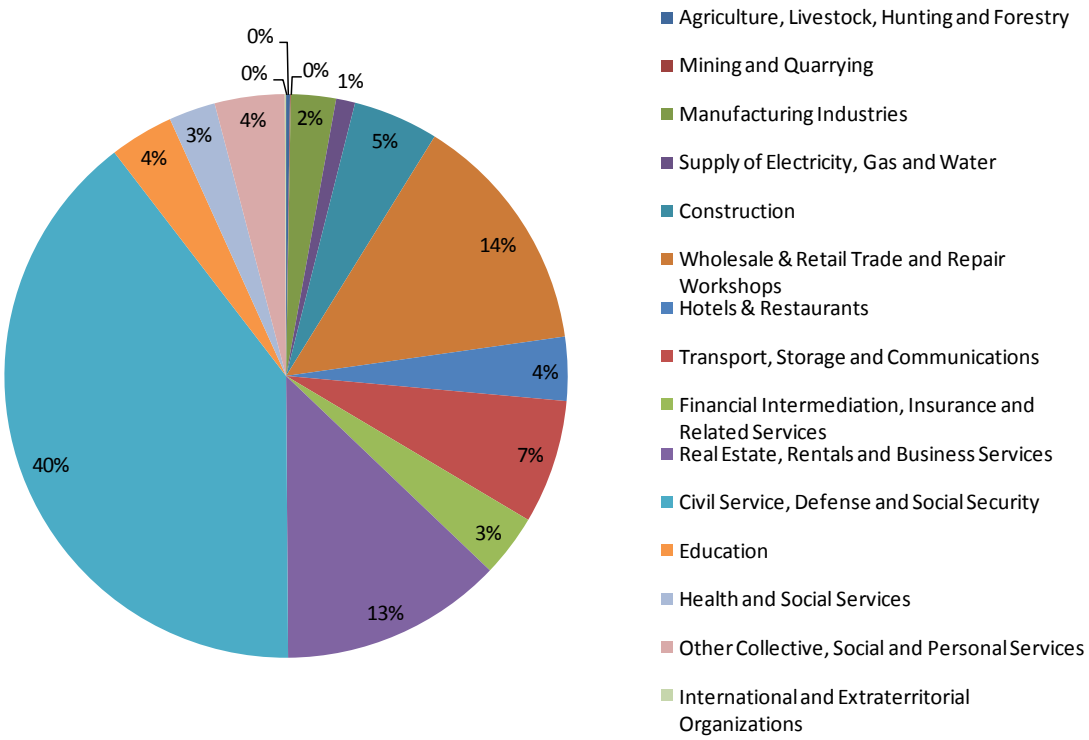
Source: Author's calculation based on CEMPRE data.

Figure C-6. Contributions to the Inequality between States (2007)



Source: Author's calculation based on CEMPRE data.

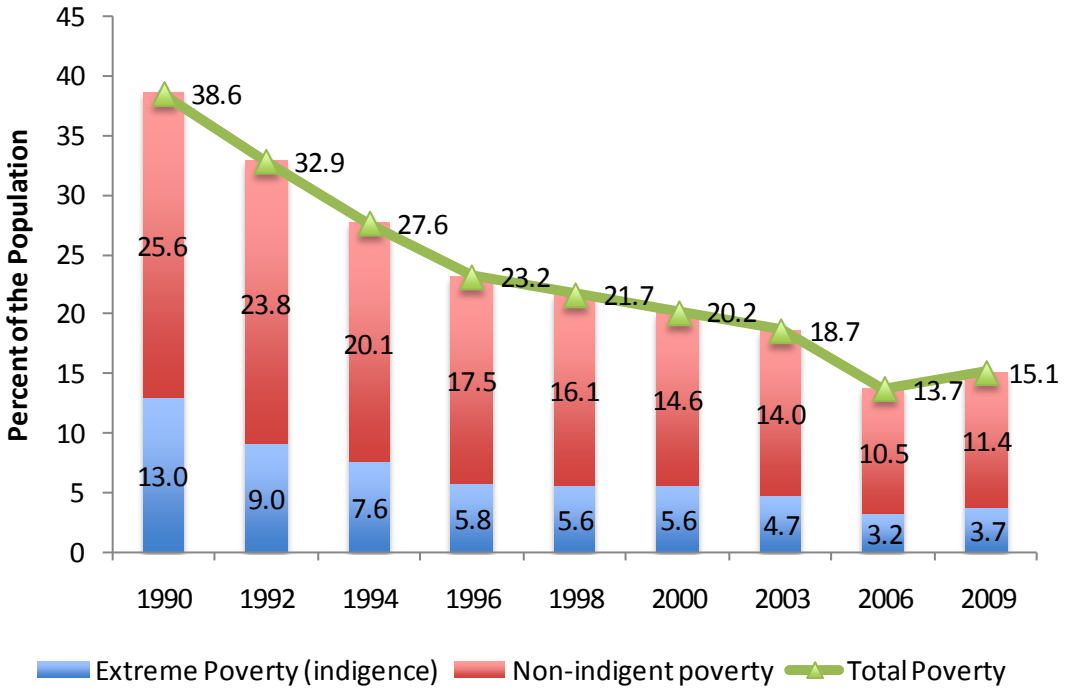
Figure C-7. Population Shares in the Federal District (2007)



Source: Author's calculation based on CEMPRE data.

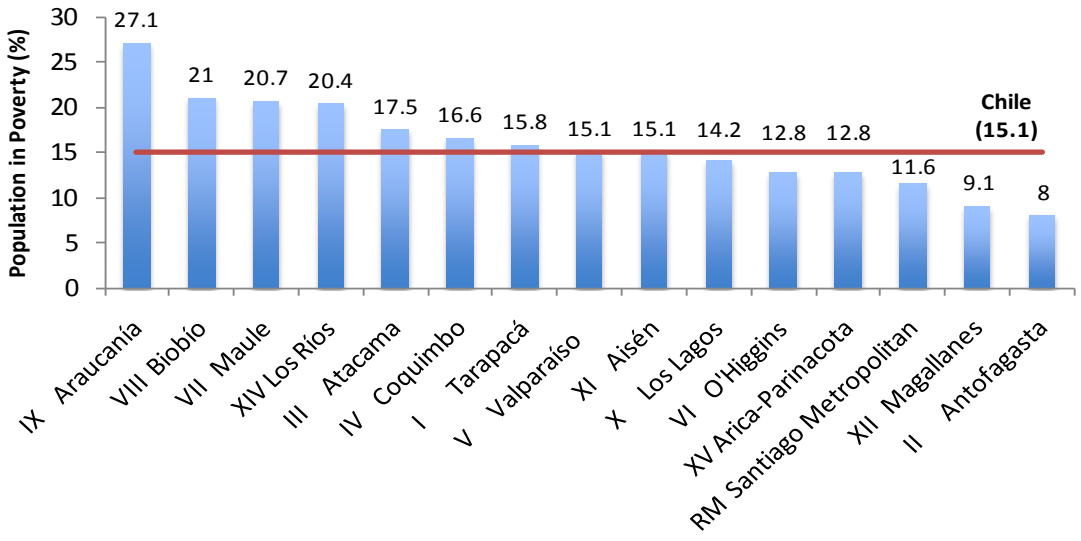
APPENDIX D. CHILE

Figure D-1. Evolution of Poverty in Chile, 1990 - 2009



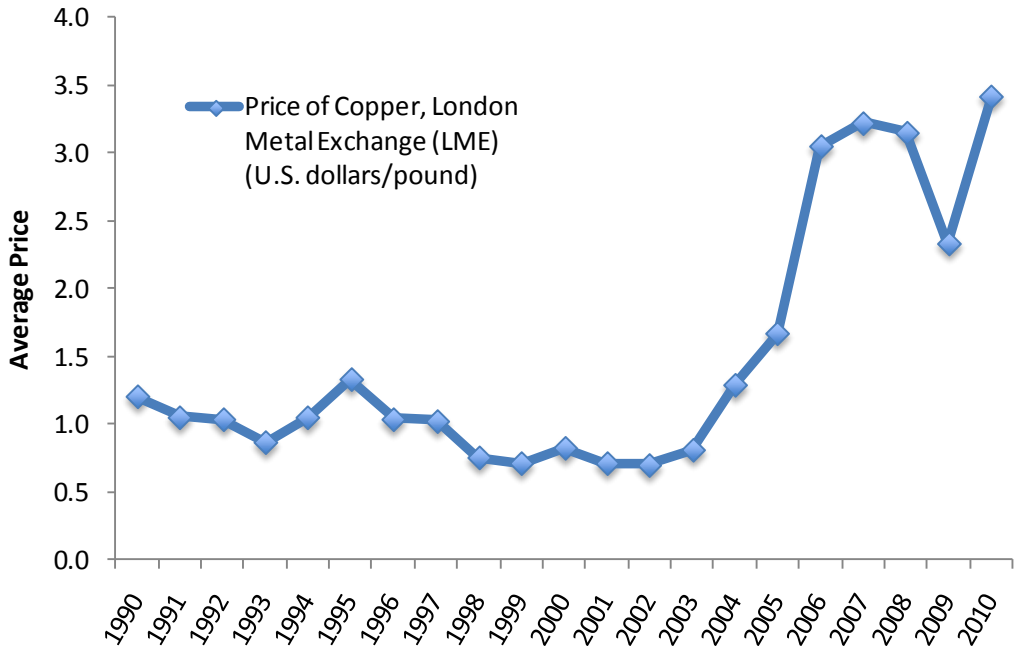
Source: MIDEPLAN, CASEN.

Figure D-2. Regional Poverty Index, 2009



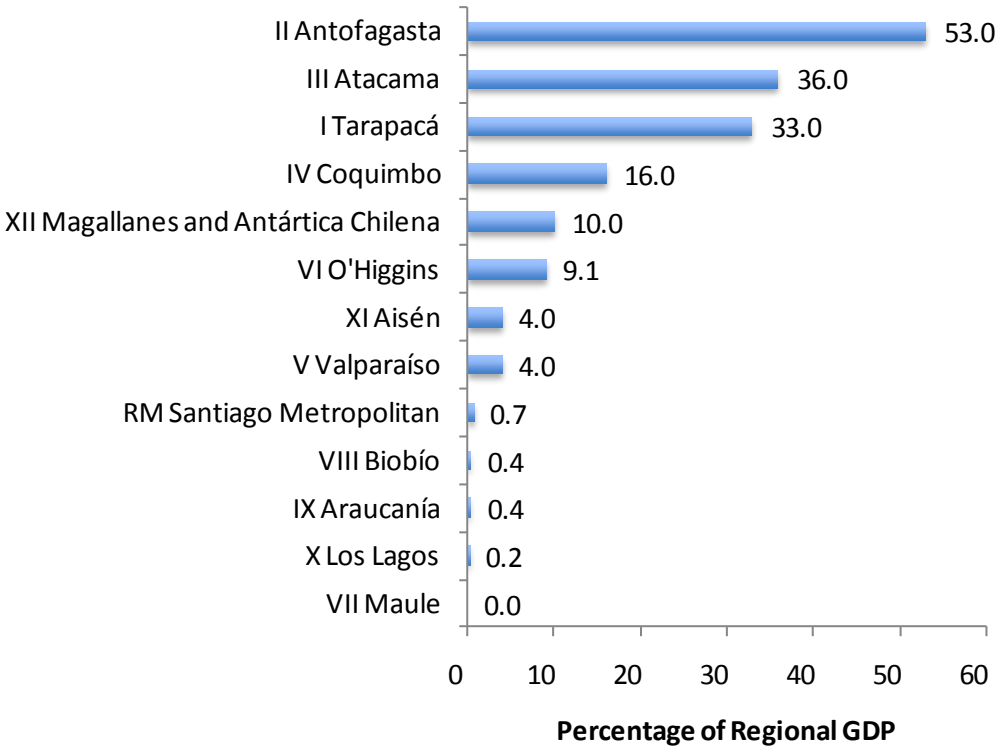
Source: MIDEPLAN, CASEN, 2009.

Figure D-3. Price of Copper on the London Metal Exchange, 1990 - 2010



Source: MIDEPLAN, CASEN.

Figure D-4. Portion of Regional GDP Derived from Mining Activities, 2008



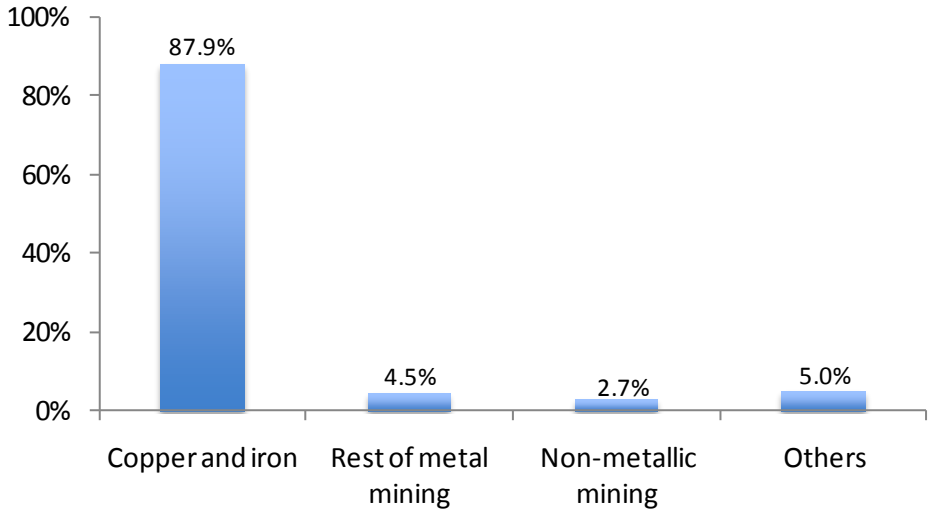
Source: Central Bank of Chile.

Table D-1. Percentage of Regional GDP by Economic Sector, 2008

	Agriculture & Forestry	Fishing	Mining	Manufacturing	Utilities	Construction	Commerce, Restaurants and Hotels	Transportation & Communications	Business and Financial Services	Owner-occupied dwellings	Personal Services	Public Administration	Minus banking imputations
I	0.5%	3.5%	33.3%	6.8%	2.0%	5.6%	18.3%	8.0%	5.6%	3.7%	7.6%	6.2%	-1.2%
II	0.0%	0.5%	52.7%	5.1%	3.4%	13.2%	4.4%	6.2%	5.1%	2.8%	5.4%	2.3%	-1.0%
III	4.0%	2.3%	35.9%	2.8%	2.2%	15.7%	6.3%	5.8%	9.5%	4.0%	8.1%	4.5%	-1.1%
IV	6.9%	2.2%	15.7%	4.9%	2.2%	15.2%	9.8%	9.1%	9.0%	7.4%	14.3%	5.2%	-2.0%
V	5.5%	0.1%	4.3%	27.6%	1.2%	10.2%	6.9%	11.3%	10.7%	6.2%	11.7%	6.2%	-2.0%
VI	23.0%	0.0%	9.1%	13.5%	1.8%	8.5%	13.7%	8.5%	7.3%	4.6%	8.2%	3.5%	-1.6%
VII	15.9%	0.0%	0.4%	22.8%	7.3%	7.8%	6.2%	10.6%	7.6%	5.7%	13.0%	4.5%	-1.9%
VIII	5.8%	2.3%	0.4%	36.1%	4.6%	7.3%	5.3%	8.6%	8.4%	5.0%	13.5%	4.4%	-1.7%
IX	10.4%	0.0%	0.4%	17.2%	1.4%	10.4%	9.1%	9.4%	10.6%	7.8%	17.9%	7.7%	-2.3%
X	8.4%	12.6%	0.2%	11.1%	2.7%	7.4%	9.4%	13.6%	11.0%	4.8%	15.4%	5.3%	-2.0%
XI	2.0%	21.9%	3.8%	4.1%	2.1%	11.0%	5.1%	9.4%	6.4%	4.5%	12.6%	18.4%	-1.3%
XII	0.5%	5.8%	9.6%	23.2%	2.1%	5.5%	8.4%	13.9%	6.7%	5.0%	7.0%	14.4%	-2.0%
RM	1.2%	0.0%	0.7%	17.0%	1.0%	7.0%	15.7%	13.4%	28.7%	7.0%	13.4%	3.4%	-8.4%

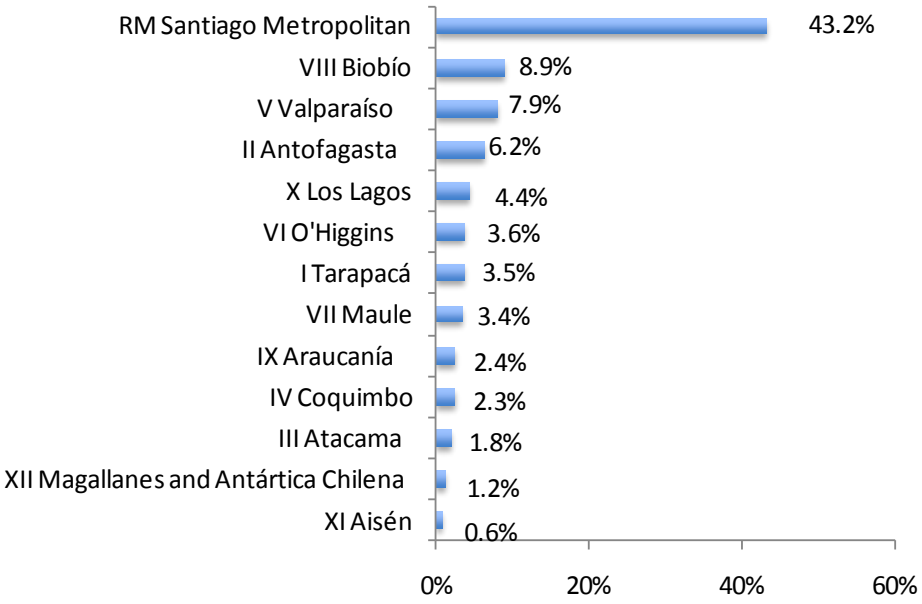
Source: Central Bank of Chile.

Figure D-5. Antofagastan Exports by Economic Sector, 2008



Source: Central Bank of Chile.

Figure D-6. Regional GDP as Share of Total GDP, 2008



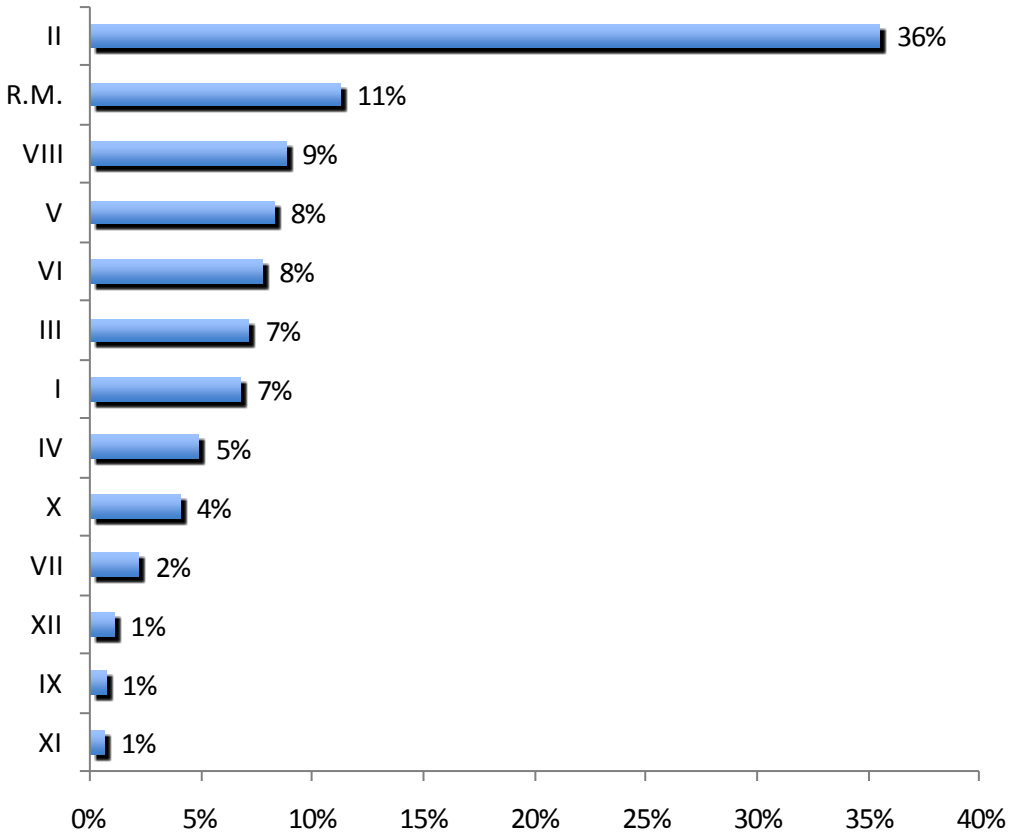
Source: Central Bank of Chile.

Table D-2. Top Five Regions

Regional GDP as share of total GDP	**Share of Total Exports**	**Income Share (Theil's T)**	**Population Share (Theil's T)**
Metropolitan Rgn. (43.2%)	II Antofagasta (35.5%)	Metropolitan Rgn. (50.5%)	Metropolitan Rgn. (46.9%)
VIII Biobío (8.9%)	Metropolitan Rgn. (11.3%)	VIII Biobío (9.5%)	VIII Biobío (10.5%)
V Valparaíso (7.9%)	VIII Biobío (8.8%)	V Valparaíso (8.6%)	V Valparaíso (9.3%)
II Antofagasta (6.2%)	V Valparaíso (8.3%)	X Los Lagos (5.4%)	X Los Lagos (6.1%)
X Los Lagos (4.4%)	VI Libertador General Bernardo O'Higgins (7.8%)	II Antofagasta (5%)	VII Maule (5.1%)

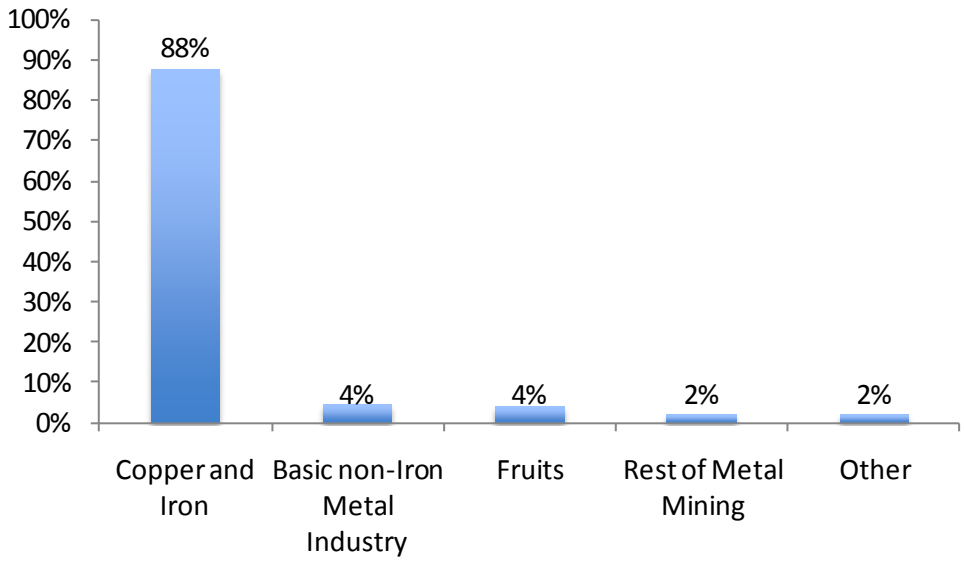
Source: Central Bank of Chile and SAFP data.

Figure D-7. Regional Share of 2008 Chilean Exports



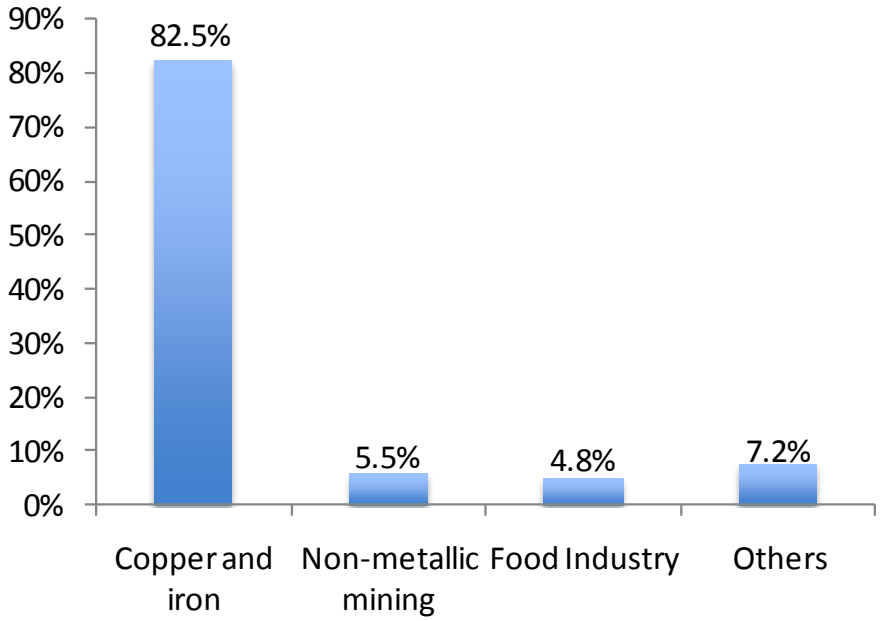
Source: Central Bank of Chile.

Figure D-8. Atacaman Exports by Economic Sector, 2008



Source: Central Bank of Chile.

Figure D-9. Tarapacan Exports by Economic Sector, 2008



Source: Central Bank of Chile.

Table D-3. Chilean Population, 2009

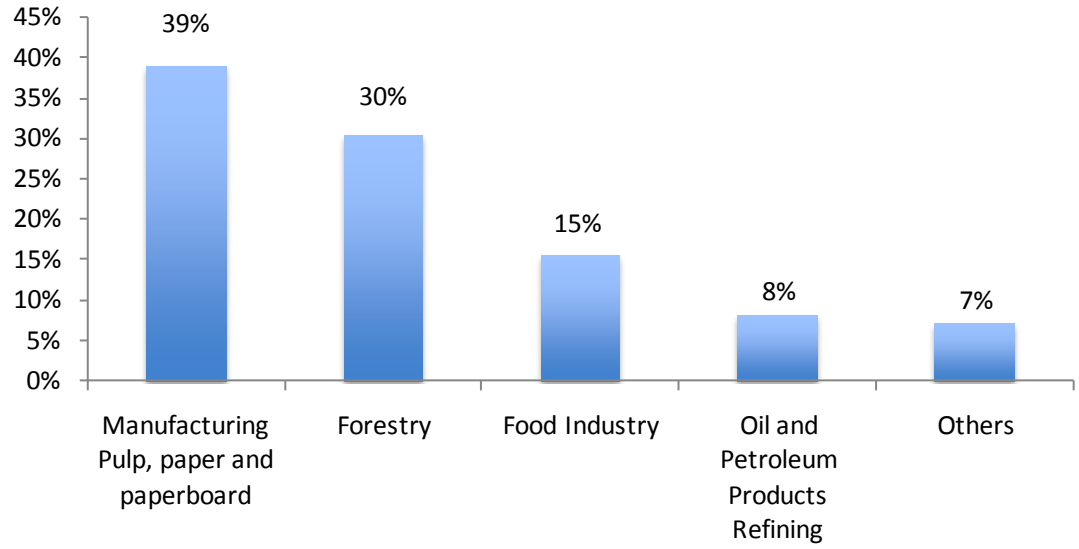
REGIONS	URBAN POPULATION	RURAL POPULATION	TOTAL	POPULATION SHARE
I De Tarapacá*	442,772	26,536	469,308	2.8%
II De Antofagasta	529,249	8,012	537,261	3.2%
III De Atacama	248,992	20,734	269,726	1.6%
IV Coquimbo	561,448	135,580	697,028	4.2%
V De Valparaíso	1,564,049	140,548	1,704,597	10.3%
Metropolitan Rgn.	6,541,116	207,330	6,748,446	40.6%
VI O'Higgins	613,240	252,304	865,544	5.2%
VII Maule	660,486	325,829	986,315	5.9%
VIII Biobío	1,661,482	329,103	1,990,585	12.0%
IX Araucanía	634,071	302,712	936,783	5.6%
X Los Lagos **	809,201	351,929	1,161,130	7.0%
XI Aisén	81,534	12,253	93,787	0.6%
XII Magallanes	141,360	5,137	146,497	0.9%
Total	**14,489,000**	**2,118,007**	**16,607,007**	**100.0%**

* Includes the population of Arica and Parinacota

** Includes the population of Los Rios

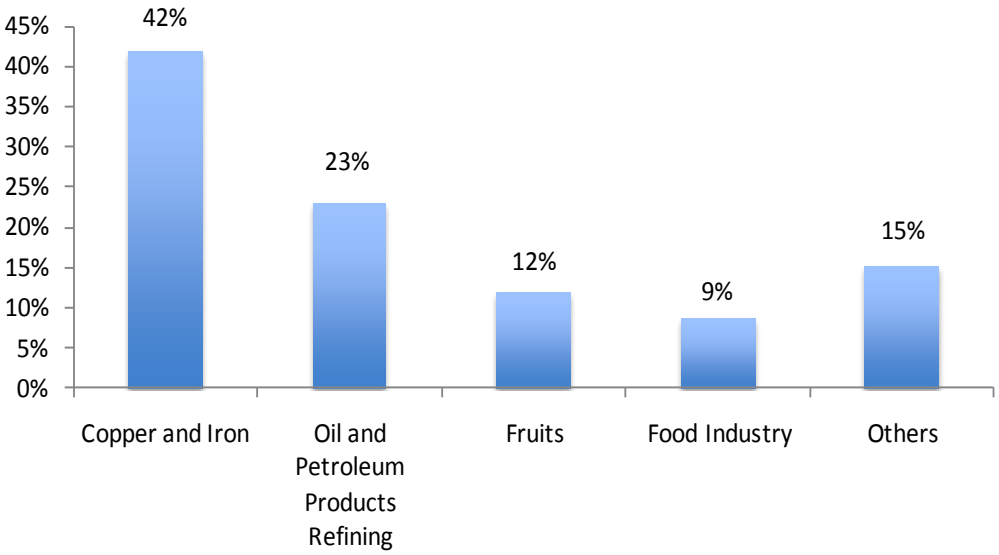
Source: MIDEPLAN, CASEN 2009.

Figure D-10. Biobío Exports by Economic Sector, 2008



Source: Central Bank of Chile.

Figure D-11. Valparaíso Exports by Economic Sector, 2008



Source: Central Bank of Chile.

APPENDIX E. THEIL ELEMENTS OBTAINED IN CALCULATIONS OF THEIL'S T STATISTIC

Table E-1. T^B Sectors: Between Sector Components of Theil's T for Argentina

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Agriculture, Livestock, Hunting and Forestry	-0.0152	-0.0173	-0.0262	-0.0252	-0.0242	-0.0228	-0.0230	-0.0182	-0.0176	-0.0175	-0.0167	-0.0173	-0.0170	-0.0163
Fishing and Related Services	0.0009	0.0011	0.0012	0.0010	0.0014	0.0012	0.0017	0.0024	0.0048	0.0054	0.0040	0.0033	0.0052	0.0038
Mining and Quarrying	0.0130	0.0136	0.0156	0.0161	0.0166	0.0176	0.0155	0.0116	0.0116	0.0201	0.0204	0.0252	0.0278	0.0307
Food, Beverage and Tobacco	0.0009	0.0014	0.0033	0.0039	0.0036	0.0031	0.0027	0.0021	0.0042	0.0064	0.0075	0.0078	0.0067	0.0055
Manufacture of Textiles and Leather	-0.0078	-0.0079	-0.0072	-0.0063	-0.0059	-0.0055	-0.0052	-0.0053	-0.0053	-0.0046	-0.0036	-0.0033	-0.0039	-0.0044
Wood, Paper, Printing and Publishing	0.0022	0.0022	0.0023	0.0023	0.0020	0.0011	0.0025	0.0054	0.0033	0.0033	0.0033	0.0030	0.0023	0.0016
Petroleum Derivatives and Chemicals	0.0273	0.0306	0.0321	0.0333	0.0327	0.0317	0.0303	0.0346	0.0412	0.0373	0.0314	0.0258	0.0231	0.0207
Basic Metals, except Machinery and Equipment	0.0008	0.0009	0.0016	0.0016	0.0012	0.0005	0.0011	0.0006	0.0015	0.0030	0.0044	0.0049	0.0050	0.0047
Transport	0.0108	0.0079	0.0068	0.0066	0.0051	0.0050	0.0058	0.0043	0.0051	0.0052	0.0061	0.0073	0.0079	0.0082

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Material														
Machinery and Equipment	0.0068	0.0061	0.0056	0.0044	0.0045	0.0047	0.0053	0.0023	0.0016	0.0024	0.0026	0.0029	0.0028	0.0023
Other Manufacturing	0.0027	0.0027	0.0029	0.0028	0.0028	0.0027	0.0022	-0.0004	-0.0005	0.0004	0.0006	0.0008	0.0005	0.0003
Supply of Electricity, Gas and Water	0.0167	0.0156	0.0157	0.0156	0.0139	0.0148	0.0165	0.0156	0.0147	0.0148	0.0136	0.0127	0.0120	0.0113
Construction	-0.0160	-0.0162	-0.0162	-0.0189	-0.0196	-0.0174	-0.0163	-0.0126	-0.0065	-0.0082	-0.0100	-0.0114	-0.0121	-0.0112
Wholesale & Retail Trade and Workshops	-0.0267	-0.0271	-0.0260	-0.0232	-0.0221	-0.0204	-0.0192	-0.0253	-0.0264	-0.0229	-0.0206	-0.0198	-0.0223	-0.0245
Hotels and Restaurants	-0.0087	-0.0086	-0.0083	-0.0077	-0.0076	-0.0071	-0.0071	-0.0081	-0.0083	-0.0082	-0.0080	-0.0085	-0.0085	-0.0089
Transport, Storage and Communications	0.0154	0.0138	0.0153	0.0122	0.0124	0.0126	0.0146	0.0195	0.0166	0.0185	0.0208	0.0218	0.0240	0.0222
Financial Intermediation	0.0439	0.0452	0.0464	0.0489	0.0519	0.0568	0.0582	0.0598	0.0674	0.0498	0.0453	0.0387	0.0310	0.0302
Real Estate, Business Services and Rentals	-0.0052	-0.0037	-0.0025	-0.0005	-0.0003	-0.0033	-0.0042	-0.0122	-0.0116	-0.0111	-0.0122	-0.0130	-0.0138	-0.0171
Public Administration, Defense and Extraterritorial Organizations	0.0261	0.0256	0.0313	0.0274	0.0284	0.0257	0.0179	0.0168	0.0097	0.0038	0.0035	0.0082	0.0127	0.0221

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
and Bodies														
Social Services, Private Education and Health	-0.0216	-0.0215	-0.0208	-0.0209	-0.0209	-0.0225	-0.0237	-0.0237	-0.0318	-0.0312	-0.0295	-0.0261	-0.0217	-0.0192
Other Community, Social and Personal Services	-0.0096	-0.0064	-0.0066	-0.0066	-0.0086	-0.0108	-0.0094	-0.0053	-0.0049	-0.0041	-0.0062	-0.0082	-0.0088	-0.0090

Source: Author's calculations based on SIPA data.

Table E-2. T^B Geographic Units: Between Province Components of Theil's T for Argentina

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Buenos Aires City	0.0898	0.0941	0.0968	0.0942	0.0979	0.1066	0.1196	0.1219	0.1218	0.0988	0.0821	0.0712	0.0613	0.0590
Buenos Aires Province	-0.0097	-0.0129	-0.0121	-0.0096	-0.0115	-0.0151	-0.0186	-0.0180	-0.0177	-0.0148	-0.0110	-0.0091	-0.0095	-0.0126
Catamarca	-0.0009	-0.0011	-0.0007	-0.0003	-0.0009	-0.0011	-0.0011	-0.0012	-0.0009	-0.0007	-0.0008	-0.0009	-0.0008	-0.0007
Córdoba	-0.0118	-0.0109	-0.0106	-0.0102	-0.0109	-0.0113	-0.0109	-0.0120	-0.0131	-0.0118	-0.0114	-0.0108	-0.0107	-0.0108
Corrientes	-0.0025	-0.0029	-0.0033	-0.0033	-0.0030	-0.0030	-0.0030	-0.0033	-0.0032	-0.0028	-0.0026	-0.0029	-0.0026	-0.0026
Chaco	-0.0021	-0.0022	-0.0034	-0.0035	-0.0032	-0.0027	-0.0032	-0.0033	-0.0029	-0.0025	-0.0022	-0.0023	-0.0023	-0.0024
Chubut	0.0021	0.0021	0.0025	0.0025	0.0020	0.0013	0.0010	0.0020	0.0035	0.0049	0.0048	0.0060	0.0086	0.0099

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Entre Ríos	-0.0048	-0.0051	-0.0053	-0.0051	-0.0048	-0.0046	-0.0048	0.0054	0.0056	0.0050	0.0048	0.0049	0.0050	0.0050
Formosa	-0.0010	-0.0010	-0.0010	-0.0011	-0.0011	-0.0010	-0.0010	0.0011	0.0010	0.0009	0.0009	0.0010	0.0009	0.0009
Jujuy	-0.0016	-0.0017	-0.0022	-0.0024	-0.0024	-0.0024	-0.0027	0.0028	0.0029	0.0027	0.0022	0.0020	0.0017	0.0016
La Pampa	-0.0013	-0.0013	-0.0017	-0.0015	-0.0015	-0.0015	-0.0015	0.0015	0.0016	0.0014	0.0012	0.0012	0.0011	0.0011
La Rioja	-0.0009	-0.0008	-0.0008	-0.0009	-0.0010	-0.0011	-0.0012	0.0012	0.0013	0.0011	0.0009	0.0010	0.0010	0.0010
Mendoza	-0.0080	-0.0083	-0.0085	-0.0083	-0.0077	-0.0082	-0.0086	0.0089	0.0089	0.0084	0.0076	0.0070	0.0064	0.0061
Misiones	-0.0030	-0.0033	-0.0033	-0.0035	-0.0036	-0.0036	-0.0037	0.0037	0.0040	0.0039	0.0036	0.0036	0.0035	0.0035
Neuquén	0.0013	0.0019	0.0021	0.0018	0.0016	0.0012	0.0020	0.0025	0.0032	0.0047	0.0053	0.0063	0.0074	0.0092
Río Negro	-0.0024	-0.0023	-0.0025	-0.0024	-0.0023	-0.0025	-0.0027	0.0029	0.0031	0.0025	0.0022	0.0019	0.0017	0.0015
Salta	-0.0031	-0.0033	-0.0039	-0.0042	-0.0039	-0.0039	-0.0044	0.0043	0.0042	0.0041	0.0039	0.0031	0.0027	0.0027
San Juan	-0.0031	-0.0030	-0.0027	-0.0028	-0.0030	-0.0033	-0.0034	0.0034	0.0032	0.0030	0.0026	0.0021	0.0022	0.0022
San Luis	-0.0016	-0.0016	-0.0014	-0.0013	-0.0019	-0.0022	-0.0015	0.0017	0.0019	0.0013	0.0011	0.0008	0.0007	0.0008
Santa Cruz	0.0017	0.0024	0.0028	0.0025	0.0027	0.0012	0.0015	0.0020	0.0029	0.0039	0.0037	0.0046	0.0068	0.0085
Santa Fe	-0.0134	-0.0132	-0.0134	-0.0134	-0.0132	-0.0123	-0.0149	0.0151	0.0154	0.0131	0.0115	0.0108	0.0096	0.0083
Santiago del Estero	-0.0017	-0.0019	-0.0021	-0.0022	-0.0022	-0.0021	-0.0024	0.0022	0.0022	0.0020	0.0019	0.0019	0.0019	0.0018

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Tierra del Fuego	0.0027	0.0019	0.0015	0.0014	0.0016	0.0015	0.0016	0.0012	0.0015	0.0016	0.0021	0.0026	0.0029	0.0034
Tucumán	-0.0042	-0.0040	-0.0036	-0.0040	-0.0041	-0.0046	-0.0052	-0.0056	-0.0060	-0.0058	-0.0055	-0.0054	-0.0054	-0.0060

Source: Author's calculations based on SIPA data.

Table E-3. T^W Geographic Units: Within Province Components of Theil's T for Argentina

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Buenos Aires City	0.0078	0.0088	0.0092	0.0092	0.0095	0.0093	0.0090	0.0100	0.0142	0.0119	0.0114	0.0107	0.0102	0.0105
Buenos Aires Province	0.0102	0.0108	0.0120	0.0141	0.0130	0.0128	0.0126	0.0127	0.0147	0.0151	0.0140	0.0127	0.0118	0.0109
Catamarca	0.0003	0.0001	0.0002	0.0004	0.0005	0.0005	0.0003	0.0004	0.0007	0.0007	0.0005	0.0005	0.0005	0.0006
Córdoba	0.0024	0.0025	0.0029	0.0030	0.0029	0.0025	0.0027	0.0026	0.0028	0.0025	0.0024	0.0024	0.0023	0.0022
Corrientes	0.0003	0.0003	0.0005	0.0004	0.0004	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002	0.0003	0.0003	0.0003
Chaco	0.0004	0.0004	0.0008	0.0008	0.0008	0.0006	0.0008	0.0008	0.0007	0.0005	0.0005	0.0005	0.0004	0.0004
Chubut	0.0006	0.0006	0.0008	0.0007	0.0007	0.0008	0.0008	0.0012	0.0017	0.0018	0.0014	0.0015	0.0018	0.0018
Entre Ríos	0.0005	0.0006	0.0007	0.0008	0.0007	0.0006	0.0007	0.0008	0.0006	0.0005	0.0005	0.0005	0.0005	0.0004
Formosa	0.0001	0.0001	0.0001	0.0002	0.0002	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0001
Jujuy														

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
	0.0002	0.0002	0.0004	0.0005	0.0005	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003
La Pampa	0.0001	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002
La Rioja	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Mendoza	0.0015	0.0017	0.0021	0.0020	0.0019	0.0020	0.0016	0.0013	0.0016	0.0017	0.0014	0.0010	0.0010	0.0009
Misiones	0.0018	0.0012	0.0013	0.0012	0.0012	0.0010	0.0010	0.0012	0.0008	0.0006	0.0005	0.0006	0.0004	0.0004
Neuquén	0.0011	0.0012	0.0014	0.0014	0.0017	0.0020	0.0015	0.0017	0.0020	0.0021	0.0021	0.0025	0.0026	0.0028
Río Negro	0.0008	0.0008	0.0010	0.0010	0.0010	0.0009	0.0008	0.0006	0.0007	0.0006	0.0006	0.0006	0.0007	0.0007
Salta	0.0006	0.0006	0.0008	0.0009	0.0008	0.0008	0.0009	0.0009	0.0008	0.0007	0.0007	0.0007	0.0007	0.0006
San Juan	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004	0.0003	0.0004	0.0004	0.0004	0.0003	0.0004	0.0005	0.0005
San Luis	0.0002	0.0002	0.0002	0.0002	0.0003	0.0004	0.0002	0.0003	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003
Santa Cruz	0.0004	0.0005	0.0005	0.0005	0.0007	0.0006	0.0005	0.0007	0.0010	0.0011	0.0009	0.0008	0.0012	0.0011
Santa Fe	0.0020	0.0018	0.0024	0.0027	0.0027	0.0026	0.0029	0.0029	0.0029	0.0028	0.0026	0.0025	0.0025	0.0023
Santiago del Estero	0.0002	0.0002	0.0002	0.0003	0.0002	0.0002	0.0003	0.0003	0.0003	0.0002	0.0002	0.0001	0.0001	0.0001
Tierra del Fuego	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0005	0.0004	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Tucumán	0.0007	0.0009	0.0010	0.0011	0.0011	0.0010	0.0012	0.0013	0.0011	0.0010	0.0011	0.0010	0.0010	0.0010

Source: Author's calculations based on SIPA data.

Table E-4. T^B Sectors: Between Sector Components of Theil's T for Brazil

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Agriculture, Livestock, Hunting, Forestry, and Fishing	-0.0040	-0.0041	-0.0040	-0.0043	-0.0045	-0.0046	-0.0042	-0.0042	-0.0043	-0.0040	-0.0039	-0.0035
Mining and Quarrying	0.0054	0.0042	0.0033	0.0061	0.0015	0.0023	0.0028	0.0036	0.0038	0.0043	0.0092	0.0115
Manufacturing Industries	0.0161	0.0154	0.0113	0.0028	0.0026	0.0204	0.0186	0.0249	0.0248	0.0269	0.0054	0.0051
Supply of Electricity, Gas and Water	0.0298	0.0308	0.0254	0.0218	0.0189	0.0152	0.0149	0.0146	0.0154	0.0148	0.0102	0.0075
Construction	-0.0091	-0.0091	-0.0071	-0.0071	-0.0086	-0.0071	-0.0077	-0.0071	-0.0070	-0.0085	-0.0085	-0.0101
Wholesale & Retail Trade and Repair Workshops	-0.0443	-0.0467	-0.0486	-0.0490	-0.0512	-0.0508	-0.0513	-0.0525	-0.0536	-0.0540	-0.0535	-0.0538
Hotels & Restaurants	-0.0104	-0.0111	-0.0112	-0.0111	-0.0112	-0.0114	-0.0113	-0.0113	-0.0114	-0.0118	-0.0119	-0.0120
Transport, Storage and Communications	0.0092	0.0100	0.0079	0.0058	0.0046	0.0092	0.0074	0.0057	0.0084	0.0073	0.0121	0.0132
Financial Intermediation, Insurance and Related Services	0.0903	0.0848	0.0823	0.0747	0.0733	0.0554	0.0558	0.0547	0.0507	0.0475	0.0480	0.0485
Real Estate, Rentals	-0.0142	-0.0150	-0.0176	-0.0174	-0.0186	-0.0150	-0.0148	-0.0160	-0.0155	-0.0160	-0.0237	-0.0246

and Business Services												
Civil Service, Defense and Social Security	0.0061	0.0167	0.0231	0.0362	0.0539	0.0391	0.0423	0.0396	0.0409	0.0472	0.0750	0.0762
Education	0.0080	0.0070	0.0152	0.0188	0.0200	0.0166	0.0173	0.0174	0.0166	0.0158	0.0148	0.0163
Health and Social Services	-0.0051	-0.0048	-0.0043	-0.0039	-0.0040	-0.0049	-0.0044	-0.0038	-0.0044	-0.0047	-0.0032	-0.0028
Other Collective, Social and Personal Services	-0.0062	-0.0064	-0.0059	-0.0052	-0.0064	-0.0070	-0.0072	-0.0075	-0.0068	-0.0075	-0.0071	-0.0069
International and Extraterritorial Organizations						2.32E-05	6.89E-05	6.65E-07	4.12E-05	3.56E-05	5.73E-05	5.64E-05

Source: Author's calculations based on CEMPRE data.

Table E-5. T^B Geographic Units: Between State Components of Theil's T for Brazil

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Acre	-0.0004	-0.0004	-0.0004	-0.0003	-0.0002	-0.0003	-0.0001	-0.0002	-0.0002	-0.0002	-0.0001	0.0000
Alagoas	-0.0039	-0.0032	-0.0030	-0.0030	-0.0031	-0.0033	-0.0033	-0.0034	-0.0034	-0.0032	-0.0032	-0.0029
Amapá	0.0003	0.0003	0.0001	0.0003	0.0002	0.0000	0.0002	0.0003	0.0003	0.0001	0.0004	0.0005
Amazonas	0.0000	0.0002	0.0005	0.0006	0.0000	-0.0002	-0.0002	-0.0003	-0.0003	-0.0003	0.0000	-0.0002
Bahia	-0.0070	-0.0082	-0.0091	-0.0089	-0.0093	-0.0095	-0.0097	-0.0096	-0.0093	-0.0091	-0.0083	-0.0083
Ceará	-0.0076	-0.0074	-0.0071	-0.0077	-0.0076	-0.0077	-0.0082	-0.0080	-0.0080	-0.0077	-0.0076	-0.0080
Distrito Federal	0.0222	0.0187	0.0201	0.0265	0.0226	0.0269	0.0286	0.0270	0.0275	0.0307	0.0377	0.0363
Espírito Santo	-0.0020	-0.0015	-0.0021	-0.0023	-0.0023	-0.0030	-0.0026	-0.0024	-0.0022	-0.0028	-0.0026	-0.0020
Goiás	-0.0051	-0.0058	-0.0054	-0.0057	-0.0060	-0.0064	-0.0059	-0.0064	-0.0054	-0.0059	-0.0047	-0.0044
Maranhao	-0.0031	-0.0031	-0.0023	-0.0031	-0.0029	-0.0032	-0.0037	-0.0030	-0.0036	-0.0033	-0.0032	-0.0034

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Mato Grosso	-0.0012	-0.0019	-0.0020	-0.0019	-0.0022	-0.0025	-0.0026	-0.0024	-0.0025	-0.0026	-0.0020	-0.0023
Mato Grosso Sul	-0.0018	-0.0019	-0.0018	-0.0018	-0.0018	-0.0021	-0.0019	-0.0022	-0.0019	-0.0017	-0.0011	-0.0011
Minas Gerais	-0.0158	-0.0160	-0.0178	-0.0186	-0.0160	-0.0164	-0.0168	-0.0168	-0.0167	-0.0182	-0.0153	-0.0158
Pará	-0.0030	-0.0029	-0.0031	-0.0033	-0.0034	-0.0037	-0.0044	-0.0038	-0.0048	-0.0044	-0.0041	-0.0035
Paraíba	-0.0044	-0.0042	-0.0041	-0.0039	-0.0038	-0.0041	-0.0040	-0.0037	-0.0036	-0.0036	-0.0035	-0.0034
Paraná	-0.0056	-0.0073	-0.0072	-0.0068	-0.0075	-0.0084	-0.0081	-0.0077	-0.0079	-0.0065	-0.0073	-0.0073
Pernambuco	-0.0082	-0.0081	-0.0080	-0.0080	-0.0071	-0.0079	-0.0074	-0.0072	-0.0081	-0.0082	-0.0079	-0.0077
Piauí	-0.0026	-0.0025	-0.0025	-0.0024	-0.0024	-0.0025	-0.0026	-0.0025	-0.0025	-0.0025	-0.0022	-0.0017
Rio de Janeiro	0.0074	0.0075	0.0078	0.0097	0.0156	0.0171	0.0184	0.0180	0.0190	0.0166	0.0146	0.0142
Rio Gde Norte	-0.0037	-0.0034	-0.0035	-0.0034	-0.0036	-0.0035	-0.0036	-0.0038	-0.0035	-0.0021	-0.0032	-0.0029
Rio Gde Sul	-0.0043	-0.0048	-0.0048	-0.0032	-0.0036	-0.0045	-0.0028	-0.0014	-0.0006	-0.0001	-0.0016	-0.0007
Rondonia	-0.0003	-0.0009	-0.0007	-0.0006	-0.0008	-0.0011	-0.0007	-0.0008	-0.0008	-0.0009	-0.0007	-0.0009
Roraima	0.0001	0.0000	0.0002	0.0002	0.0001	0.0001	-0.0001	0.0000	-0.0002	0.0000	0.0001	0.0001
Santa Catarina	-0.0038	-0.0037	-0.0052	-0.0057	-0.0068	-0.0073	-0.0059	-0.0059	-0.0060	-0.0053	-0.0059	-0.0057
Sao Paulo	0.0842	0.0913	0.0933	0.0854	0.0825	0.0896	0.0832	0.0798	0.0788	0.0736	0.0621	0.0602
Sergipe	-0.0017	-0.0018	-0.0019	-0.0016	-0.0018	-0.0019	-0.0018	-0.0018	-0.0016	-0.0015	-0.0013	-0.0012
Tocantins	-0.0005	-0.0008	-0.0009	-0.0009	-0.0008	-0.0010	-0.0012	-0.0011	-0.0012	-0.0010	-0.0008	-0.0008

Source: Author's calculations based on CEMPRE data.

Table E-6. T^W Geographic Units: Within State Components of Theil's T for Brazil

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Acre	0.0001	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0002
Alagoas	0.0008	0.0009	0.0008	0.0008	0.0008	0.0006	0.0006	0.0006	0.0005	0.0004	0.0007	0.0006
Amapá	0.0002	0.0003	0.0002	0.0003	0.0003	0.0002	0.0003	0.0004	0.0004	0.0003	0.0004	0.0004
Amazonas	0.0004	0.0005	0.0005	0.0006	0.0005	0.0006	0.0005	0.0006	0.0006	0.0006	0.0007	0.0007
Bahia	0.0037	0.0035	0.0033	0.0037	0.0035	0.0023	0.0024	0.0025	0.0024	0.0024	0.0026	0.0026

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Ceará	0.0022	0.0023	0.0020	0.0019	0.0023	0.0015	0.0017	0.0015	0.0016	0.0016	0.0016	0.0016
Distrito Federal	0.0046	0.0043	0.0035	0.0051	0.0053	0.0053	0.0059	0.0064	0.0069	0.0069	0.0100	0.0100
Espírito Santo	0.0017	0.0016	0.0016	0.0016	0.0017	0.0013	0.0014	0.0015	0.0016	0.0014	0.0015	0.0015
Goiás	0.0018	0.0016	0.0017	0.0016	0.0015	0.0012	0.0013	0.0011	0.0014	0.0012	0.0013	0.0015
Maranhao	0.0009	0.0008	0.0006	0.0007	0.0008	0.0006	0.0005	0.0006	0.0005	0.0004	0.0004	0.0005
Mato Grosso	0.0015	0.0012	0.0011	0.0011	0.0011	0.0007	0.0006	0.0008	0.0009	0.0006	0.0008	0.0007
Mato Grosso Sul	0.0008	0.0008	0.0008	0.0007	0.0009	0.0007	0.0008	0.0007	0.0008	0.0008	0.0011	0.0011
Minas Gerais	0.0071	0.0072	0.0068	0.0067	0.0077	0.0065	0.0060	0.0056	0.0059	0.0055	0.0064	0.0056
Pará	0.0015	0.0015	0.0014	0.0012	0.0013	0.0010	0.0010	0.0011	0.0010	0.0009	0.0010	0.0010
Paraíba	0.0009	0.0008	0.0011	0.0009	0.0009	0.0006	0.0006	0.0005	0.0005	0.0005	0.0006	0.0005
Paraná	0.0063	0.0052	0.0050	0.0047	0.0046	0.0036	0.0034	0.0035	0.0035	0.0036	0.0032	0.0031
Pernambuco	0.0022	0.0022	0.0022	0.0018	0.0024	0.0013	0.0015	0.0016	0.0015	0.0016	0.0013	0.0015
Piauí	0.0008	0.0007	0.0006	0.0007	0.0007	0.0004	0.0005	0.0005	0.0005	0.0005	0.0005	0.0006
Rio de Janeiro	0.0114	0.0105	0.0103	0.0117	0.0105	0.0093	0.0100	0.0101	0.0095	0.0097	0.0117	0.0124
Rio Gde Norte	0.0015	0.0011	0.0011	0.0014	0.0008	0.0006	0.0007	0.0006	0.0007	0.0012	0.0011	0.0011
Rio Gde Sul	0.0044	0.0043	0.0049	0.0048	0.0054	0.0042	0.0042	0.0042	0.0042	0.0040	0.0042	0.0050
Rondonia	0.0005	0.0005	0.0006	0.0006	0.0006	0.0004	0.0006	0.0006	0.0006	0.0005	0.0006	0.0005
Roraima	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Santa Catarina	0.0031	0.0034	0.0033	0.0035	0.0032	0.0025	0.0029	0.0028	0.0026	0.0026	0.0026	0.0024
Sao Paulo	0.0229	0.0250	0.0235	0.0214	0.0223	0.0205	0.0199	0.0199	0.0195	0.0197	0.0204	0.0207
Sergipe	0.0011	0.0010	0.0009	0.0019	0.0006	0.0004	0.0005	0.0006	0.0006	0.0006	0.0009	0.0010
Tocantins	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002

Source: Author's calculations based on CEMPRE data.

Table E-7. T^B Sectors: Between Sector Components of Theil's T for Chile, 1995 – 2006 Q2

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Agriculture and Fishing	-0.0260	-0.0259	-0.0236	-0.0235	-0.0247	-0.0242	-0.0252	-0.0249	-0.0256	-0.0257	-0.0272	-0.0265
Mining and Petroleum	0.0357	0.0341	0.0319	0.0239	0.0200	0.0215	0.0229	0.0282	0.0261	0.0210	0.0250	0.0241
Manufacturing	0.0089	0.0112	0.0109	0.0144	0.0154	0.0155	0.0133	0.0079	0.0077	0.0090	0.0086	0.0089
Utilities	0.0094	0.0087	0.0079	0.0081	0.0079	0.0069	0.0057	0.0057	0.0053	0.0055	0.0048	0.0042
Construction	-0.0094	-0.0115	-0.0123	-0.0117	-0.0105	-0.0124	-0.0129	-0.0128	-0.0121	-0.0131	-0.0134	-0.0136
Wholesale and Retail Trade	-0.0259	-0.0262	-0.0256	-0.0248	-0.0240	-0.0220	-0.0214	-0.0220	-0.0210	-0.0226	-0.0242	-0.0224
Transport and Communications	0.0013	-0.0001	-0.0002	-0.0005	-0.0018	-0.0014	-0.0018	-0.0023	-0.0019	-0.0016	-0.0006	-0.0001
Finance and Professional Services	0.0333	0.0315	0.0295	0.0265	0.0221	0.0208	0.0220	0.0215	0.0196	0.0272	0.0256	0.0259
Public, Social, Personal, and International Services	-0.0009	0.0042	0.0052	0.0078	0.0141	0.0135	0.0164	0.0196	0.0215	0.0192	0.0231	0.0192

Source: Author's calculations based on SAFP data.

Table E-8. T^B Sectors: Between Sector Components of Theil's T for Chile, 2006 Q3 – 2010 Q2

	2006	2007	2008	2009	2010
Agriculture	-0.0194	-0.0193	-0.0179	-0.0163	-0.0196
Fishing	0.0004	0.0003	0.0004	0.0003	0.0004
Mining and Petroleum	0.0250	0.0228	0.0251	0.0228	0.0260

	2006	2007	2008	2009	2010
Manufacturing - Non-metallic	0.0023	0.0028	0.0046	0.0039	0.0035
Manufacturing - Metallic	0.0051	0.0048	0.0069	0.0057	0.0050
Utilities	0.0041	0.0036	0.0040	0.0042	0.0048
Construction	-0.0071	-0.0062	-0.0052	-0.0047	-0.0042
Wholesale and Retail Trade	-0.0091	-0.0087	-0.0075	-0.0080	-0.0084
Hotels and Restaurants	-0.0064	-0.0066	-0.0067	-0.0072	-0.0072
Transport and Communications	0.0025	0.0032	0.0028	0.0020	0.0018
Finance and Professional Services	0.0262	0.0251	0.0300	0.0279	0.0288
Real Estate	-0.0218	-0.0222	-0.0110	-0.0197	-0.0203
Public Administration and Defense	0.0154	0.0161	0.0172	0.0195	0.0195
Teaching	0.0247	0.0238	0.0230	0.0239	0.0232
Social and Health Services	0.0036	0.0044	0.0038	0.0055	0.0071
Other Community, Social, and Personal Serivce Activities	-0.0122	-0.0141	-0.0373	-0.0296	-0.0270
Building and Condominium Administration	-0.0029	-0.0013	-0.0003	-0.0005	-0.0008
International Organizations	0.0002	0.0002	0.0003	0.0001	0.0002

Source: Author's calculations based on SAFP data.

Table E-9. T^B Geographic Units: Between Regions Components of Theil's T for Chile, 1995 – 2006 Q2

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
I	0.0002	-0.0002	-0.0001	0.0002	0.0003	0.0002	-0.0004	0.0000	0.0000	-0.0001	-0.0002	-0.0001
II	0.0143	0.0152	0.0152	0.0152	0.0142	0.0142	0.0147	0.0149	0.0156	0.0139	0.0152	0.0153
III	0.0022	0.0023	0.0024	0.0021	0.0017	0.0015	0.0016	0.0016	0.0018	0.0016	0.0018	0.0020
IV	-0.0037	-0.0035	-0.0033	-0.0032	-0.0032	-0.0029	-0.0029	-0.0028	-0.0027	-0.0028	-0.0030	-0.0028
V	-0.0086	-0.0086	-0.0082	-0.0082	-0.0078	-0.0076	-0.0073	-0.0073	-0.0066	-0.0074	-0.0084	-0.0079
VI	-0.0068	-0.0067	-0.0067	-0.0068	-0.0068	-0.0066	-0.0067	-0.0064	-0.0066	-0.0072	-0.0084	-0.0085
VII	-0.0118	-0.0117	-0.0111	-0.0113	-0.0113	-0.0110	-0.0110	-0.0104	-0.0102	-0.0105	-0.0111	-0.0113
VIII	-0.0110	-0.0110	-0.0103	-0.0109	-0.0103	-0.0105	-0.0105	-0.0097	-0.0086	-0.0085	-0.0093	-0.0084
IX	-0.0085	-0.0080	-0.0077	-0.0073	-0.0070	-0.0068	-0.0062	-0.0058	-0.0056	-0.0057	-0.0065	-0.0064
X	-0.0114	-0.0108	-0.0103	-0.0099	-0.0094	-0.0091	-0.0086	-0.0082	-0.0075	-0.0073	-0.0078	-0.0082
XI	-0.0006	-0.0004	-0.0005	-0.0004	-0.0004	-0.0003	-0.0004	-0.0003	-0.0001	-0.0001	-0.0001	-0.0002
XII	0.0014	0.0014	0.0012	0.0011	0.0014	0.0012	0.0010	0.0008	0.0009	0.0007	0.0006	0.0005
Metropolitan Rgn.	0.0567	0.0540	0.0506	0.0500	0.0486	0.0471	0.0454	0.0417	0.0373	0.0411	0.0465	0.0451

Source: Author's calculations based on SAFP data.

Table E-10. T^B Geographic Units: Between Regions Components of Theil's T for Chile, 2006 Q3 – 2010 Q2

	2006	2007	2008	2009	2010
I	-0.0004	-0.0001	0.0005	0.0003	0.0010
II	0.0149	0.0157	0.0164	0.0155	0.0166
III	0.0020	0.0024	0.0027	0.0023	0.0028

	2006	2007	2008	2009	2010
IV	-0.0026	-0.0023	-0.0022	-0.0020	-0.0014
V	-0.0073	-0.0065	-0.0064	-0.0064	-0.0064
VI	-0.0077	-0.0077	-0.0075	-0.0071	-0.0075
VII	-0.0114	-0.0112	-0.0107	-0.0102	-0.0102
VIII	-0.0087	-0.0082	-0.0086	-0.0077	-0.0073
IX	-0.0064	-0.0062	-0.0064	-0.0061	-0.0064
X	-0.0076	-0.0073	-0.0072	-0.0071	-0.0079
XI	-0.0002	-0.0002	-0.0001	-0.0002	-0.0002
XII	0.0003	0.0003	0.0002	0.0002	0.0004
Metropolitan Rgn.	0.0436	0.0397	0.0376	0.0359	0.0342

Source: Author's calculations based on SAFP data.

Table E-11. T^W Geographic Units: Within Regions Components of Theil's T for Chile, 1995 – 2006 Q2

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
I	0.0004	0.0005	0.0005	0.0007	0.0008	0.0009	0.0010	0.0011	0.0009	0.0008	0.0009	0.0008
II	0.0032	0.0034	0.0028	0.0023	0.0022	0.0023	0.0025	0.0028	0.0026	0.0020	0.0026	0.0024
III	0.0010	0.0011	0.0012	0.0010	0.0008	0.0008	0.0008	0.0009	0.0010	0.0008	0.0011	0.0011
IV	0.0007	0.0009	0.0008	0.0007	0.0008	0.0009	0.0009	0.0009	0.0009	0.0008	0.0010	0.0010
V	0.0027	0.0023	0.0023	0.0022	0.0020	0.0021	0.0021	0.0022	0.0020	0.0018	0.0020	0.0020
VI	0.0046	0.0043	0.0040	0.0029	0.0021	0.0021	0.0023	0.0027	0.0025	0.0023	0.0025	0.0022
VII	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0009	0.0012	0.0011
VIII	0.0017	0.0016	0.0016	0.0015	0.0016	0.0015	0.0015	0.0014	0.0012	0.0013	0.0015	0.0013
IX	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007	0.0007	0.0007	0.0008	0.0008
X	0.0006	0.0007	0.0007	0.0008	0.0008	0.0007	0.0007	0.0008	0.0007	0.0006	0.0007	0.0006
XI	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
XII	0.0010	0.0009	0.0009	0.0009	0.0006	0.0006	0.0006	0.0007	0.0005	0.0005	0.0005	0.0004
	0.0078	0.0075	0.0070	0.0063	0.0054	0.0051	0.0052	0.0054	0.0052	0.0052	0.0053	0.0049

Metropolitan Rgn.												

Source: Author's calculations based on SAFP data.

Table E-12. T^W Geographic Units: Within Regions Components of Theil's T for Chile, 2006 Q3 – 2010 Q2

	2006	2007	2008	2009	2010
I	0.0013	0.0012	0.0012	0.0011	0.0012
II	0.0025	0.0024	0.0028	0.0024	0.0026
III	0.0013	0.0011	0.0010	0.0008	0.0010
IV	0.0013	0.0013	0.0012	0.0012	0.0015
V	0.0032	0.0031	0.0030	0.0029	0.0032
VI	0.0025	0.0022	0.0025	0.0024	0.0028
VII	0.0015	0.0015	0.0017	0.0018	0.0019
VIII	0.0025	0.0023	0.0025	0.0026	0.0024
IX	0.0013	0.0012	0.0013	0.0014	0.0016
X	0.0018	0.0016	0.0018	0.0018	0.0019
XI	0.0002	0.0002	0.0002	0.0002	0.0002
XII	0.0005	0.0004	0.0005	0.0004	0.0004
Metropolitan Rgn.	0.0099	0.0096	0.0118	0.0110	0.0119

Source: Author's calculations based on SAFP data.

Glossary

AFIP: Federal Administration of Public Revenues (Administración Federal de Ingresos Públicos).

AFP: Pension Fund Administrators (Administradoras de Fondos de Pensiones).

BCRA: The Argentine Central Bank (Banco Central de la República Argentina).

CABA: City of Buenos Aires (Ciudad Autónoma de Buenos Aires).

CAGED: General Register of Employment and Unemployment (Cadastro Geral de Empregados e Desempregados).

CASEN: Chilean National Household Survey (Encuesta de Caracterización Socioeconómica Nacional).

CEDLAS: Center for Distributional, Labor and Social Studies (Centro de Estudios Distributivos Laborales y Sociales).

CEMPRE: Central Business Registry (Cadastro Central de Empresas).

CIIU: Classification of All Economic Activities (Clasificación Industrial Internacional Uniforme).

CNAE: Classification of Economic Activity (Classificação Nacional de Atividades Econômicas).

CNJP: National Register of Legal Entities (Cadastro Nacional da Pessoa Juridica).

CODELCO: The National Copper Corporation of Chile (Corporación Nacional del Cobre de Chile).

CVRD: Brazilian mining company (Companhia Vale do Rio Doce).

EPH-C: Continuous Permanent Household Survey (Encuesta Permanente de Hogares Continua).

EPH: Argentine Permanent Household Survey (Encuesta Permanente de Hogares).

GDP: Gross Domestic Product (Producto Bruto Interno).

GGP: Gross Geographic Product (Producto Bruto Geográfico).

IBGE: Brazilian Institute of Geography and Statistics (Instituto Brasileiro de Geografia e Estatistica).

ICR: Index of Regional Competitiveness (Indice de Competitividad Regional).

INDEC: Argentine National Institute of Statistics and Census (Instituto Nacional de Estadística y Censos).

INE: National Statistics Institute of Chile (Instituto Nacional de Estadísticas de Chile).

INP: Chilean Institute of Pension Settlements (Instituto de Normalización Previsional).

IPC: Consumer Price Index (Indice de Precios al Consumidor).

ISI: Industrialization via Import Substitution.

ISIC: International Standard Industrial Classification of all Economic Activities.

LAC: Latin American countries.

LIS: Luxembourg Income Study

MECE: Mutually Exclusive and Collectively Exhaustive.

MECOVI: Measurement of Living Conditions in Latin America and the Caribbean.

MIDEPLAN: Ministry of Planning and Cooperation (Ministerio de Planificación y Cooperación).

MTE: Brazilian Ministry of Labor and Employment (Ministério de Trabalho e Emprego).

MTEySS: Argentine Ministry of Labour, Employment and Social Security (Ministerio de Trabajo, Empleo y Seguridad Social).

NRF: Natural Resource Fund.

ODEPLAN: Office of National Planning (Oficina de Planificación Nacional).

OEDE: Employment and Business Dynamics Observatory (Observatorio de Empleo y Dinámica Empresarial).

PNAD: Brazilian National Household Survey (Pesquisa Nacional por Amostra de Domicílios).

RAIS: Annual Report of Social Information (Relação Anual de Informações Sociais).

SAFP: Superintendency of Pension Fund Administrators (Superintendencia de Administradoras de Fondos de Pensiones).

SEDLAC: Socio-Economic Database for Latin America and the Caribbean (Base de Datos Socioeconómicos para América Latina y El Caribe).

SIJP: Integrated Retirement and Pension System (Sistema Integrado de Jubilaciones y Pensiones).

SIPA: Argentine Integrated Pension System (Sistema Integrado Previsional Argentino).

SUBDERE: Chilean Sub-Secretary for Regional and Administrative Development (Subsecretaría de Desarrollo Regional y Administrativo).

UF: Inflation-Indexed Unit of Account (Unidad de Fomento).

UN-WIDER: The United Nations-World Institute for Development Economics Research.

UNICEF-ICDC: United Nations Children's Fund-International Child Development Centre.

UNU-WIDER: The United Nations University-World Institute for Development Economics Research.

UTIP: University of Texas Inequality Project.

WIID: World Income Inequality Database

References

Acosta, Pablo and Leonardo Gasparini. 2007. "Capital Accumulation, Trade Liberalization, and Rising Wage Inequality: The Case of Argentina." *Economic Development & Cultural Change* 55(4):793-812.

Adair, Craig. 2006. "Structural Change, Inequality, and Growth in Mexico." UTIP Working Paper No. 35, The University of Texas, Austin, Texas.

Alejo, Javier 2006. "Desigualdad Salarial en el Gran Buenos Aires: Una Aplicación de Regresión por Cuantiles en Microdescomposiciones." CEDLAS Working Paper No. 36, Centro de Estudios Distributivos, Laborales y Sociales, Buenos Aires, Argentina.

Almeida dos Reis, Jose Guilherme and Ricardo Paes de Barros. 1991. "Wage inequality and the distribution of education: A study of the evolution of regional differences in inequality in metropolitan Brazil." *Journal of Development Economics* 36(1):117-143.

Altimir, Oscar. 1986. "Estimaciones de la Distribución del Ingreso en la Argentina, 1953-1980." *Desarrollo Económico* 25(100):521-566.

—. 1987. "Income Distribution Statistics in Latin America and Their Reliability " *Review of Income & Wealth* 33(2):111-155.

Altimir, Oscar and Luis Beccaria. 1999. "Distribución del Ingreso en la Argentina." Serie Reformas Económicas No. 40, Comisión Económica para América Latina y el Caribe (CEPAL), Santiago, Chile.

—. 2001. "El persistente deterioro de la distribucion del ingreso en la Argentina." *Desarrollo Económico* 40(160):589-618.

Altimir, Oscar, Luis Beccaria, and Martín González Rozada. 2001. "La evolución de la distribución del ingreso familiar en argentina: Un análisis de sus determinantes." Serie de Estudios en Finanzas Públicas, Universidad Nacional de La Plata, Buenos Aires, Argentina.

Altimir, Oscar and Sebastián Piñera. 1979. "Análisis de Descomposición: Una Generalización del Método de Theil." *Cuadernos de Economía* 16(48):207-236.

Atkinson, Anthony B. 1997. "Bringing Income Distribution in From the Cold." *The Economic Journal* 107(440):297-321.

Atkinson, Anthony B. and Andrea Brandolini. 2001. "Promise and Pitfalls in the Use of "Secondary" Data-Sets: Income Inequality in OECD Countries as a Case Study." *Journal of Economic Literature* 39(3):771-799.

Barros, Ricardo, Mirela De Carvalho, Samuel Franco, and Rosane Mendonça. 2010a. "Determinantes da Queda na Desigualdade de Renda no Brasil " Working Paper No. 1460, Instituto de Pesquisa Econômica Aplicada (IPEA), Rio de Janeiro.

—. 2010b. "Markets, the State and the Dynamics of Inequality: The Case of Brazil." Discussion Paper, United Nations Development Programme, Bureau for Development Policy, Poverty Group.

Barros, Ricardo, Ricardo Henriques, and Rosane Mendonça. 2001. "A Estabilidade Inaceitável: Desigualdade e Pobreza no Brasil " Working Paper No. 800, Instituto de Pesquisa Econômica Aplicada (IPEA), Rio de Janeiro.

Bayón, María Cristina. 2002. "Coping with job insecurity: The experience of unemployment in contemporary Argentina." Dissertation, The University of Texas at Austin, Austin.

BCRA. 1975. "Sistema de cuentas del producto e ingreso de la Argentina." Banco Central de la República Argentina Buenos Aires.

Beccaria, Luis. 1991. "Distribución del Ingreso en la Argentina: Explorando lo sucedido desde mediados de los setenta." *Desarrollo Económico* 31(123):319-338.

—. 1993. "Estancamiento y Distribucion del Ingreso." in *Desigualdad y Exclusión: Desafíos para la Política Social en la Argentina de fin de siglo*, edited by A. Minujin. Buenos Aires: UNICEF: Losada.

Beccaria, Luis, Roxana Maurizio, Fernando Groisman, and Mariana Laura González. 2006. "La Sobreeducación en la Provincia de Buenos Aires: Un análisis Exploratorio." Instituto de Ciencias. Universidad Nacional de General Sarmiento, Buenos Aires, Argentina.

Beccaria, Luis and Alvaro Orsatti. 1986. "La Distribución Personal del Ingreso en el Gran Buenos Aires en el período 1974-1983." CEPAL Working Paper

No. 23, Comisión Económica para América Latina y el Caribe, Buenos Aires, Argentina.

Behrman, Jere R., Nancy Birdsall, and Miguel Székely. 2001. "Pobreza, desigualdad, y liberalización comercial y financiera en América Latina." IDB Working Paper No. 449, Inter American Development Bank, Washington, D.C.

—. 2003. "Economic Reforms and Wage Differentials in Latin America." Working Paper No. 29, Center for Global Development, Washington, D.C.

Behrman, Jere R., Nancy Birdsall, and Miguel Székely. 2007. "Economic Policy Changes and Wage Differentials in Latin America." *Economic Development and Cultural Change* 56(1):57-97.

Bianchini, Zélia Magalhães. 2003. "Quality Issues and Initiatives at the Brazilian Institute of Geography and Statistics." in *OECD/IMF Workshop on Assessing and Improving Statistical Quality*. Paris, France.

Birdsall, Nancy and Augusto De La Torre. 2001. "Washington Contentious: Economic Policies for Social Equity in Latin America." Carnegie Endowment for International Peace and Inter-American Dialogue, Washington, D.C.

Bourguignon, François. 1979. "Decomposable Income Inequality Measures." *Econometrica* 47(4):901-920.

Bourguignon, François, Francisco H. G. Ferreira, and Nora Lustig. 1998. "The microeconomics of income distribution dynamics in East Asia and Latin America." Research Proposal, IDB-World Bank Washington, D.C.

—. 2005. *The Microeconomics of Income Distribution Dynamics in East Asia and Latin America*, Washington, DC [New York]: World Bank; Oxford University Press.

Bourguignon, François, Martin Fournier, and Marc Gurgand. 1998. "Distribution, Development and Education: Taiwan, 1979-1994." Available at SSRN: http://ssrn.com/abstract=587202.

Bravo, David and Dante Contreras. 1999. "La Distribución del Ingreso en Chile 1990-1996: Análisis del Impacto del Mercado de Trabajo y las Políticas Sociales." Universidad de Chile, Santiago, Chile.

Bravo, David, Dante Contreras, and Sergio Urzúa. 2002. "Poverty and inequality in Chile 1990-1998: Learning from Microeconomic simulations." Serie Documentos de Trabajo, Departamento de Economía, Universidad de Chile, Santiago, Chile.

Bresser-Pereira, Luiz Carlos and Carmen Augusta Varela. 2004-5. "The Second Washington Consensus and Latin America's Quasi-Stagnation." *Journal of Post Keynesian Economics* 27(2):231-250.

CAGED. "Cadastro Geral de Empregados e Desempregados" Available at http://www.mte.gov.br/caged/default.asp.

Calvo, Guillermo A., Leonardo Leiderman, and Carmen M. Reinhart. 1996. "Inflows of Capital to Developing Countries in the 1990s." *Journal of Economic Perspectives* 10(2):123-139.

Cardoso, Sidnéia Reis and Ana Rosa Pais Ribeiro. 2008. "The use of administrative data for the production of official economic statistics in Brazil: current situation and challenges for the future." in *International Association for Official Statistics Conference on Reshaping Official Statistics*. Shanghai, China.

CEDLAS. 2010. "Socio-Economic Database for Latin America and the Caribbean (CEDLAS and The World Bank): Methodological Guide." Center for Distributional, Labor and Social Studies, Buenos Aires, Argentina.

Cicowiez, Martín. 2002. "Comercio y Desigualdad Salarial en Argentina: Un Enfoque de Equilibrio General Computado." Departamento de Economía, Facultad de Ciencias Económicas, Universidad Nacional de La Plata, Buenos Aires, Argentina.

Conceição, Pedro. 2000. "Growth, Technology and Inter-industry Earnings Inequality in Manufacturing: Evidence from a Selection of OECD Countries, 1970-1990." Doctor of Philosophy, The University of Texas at Austin.

Conceição, Pedro and Pedro Ferreira. 2000. "The Young Person's Guide to the Theil Index: Suggesting Intuitive Interpretations and Exploring Analytical Applications." UTIP Working Paper No. 14, The University of Texas at Austin, Austin, Texas.

Conceição, Pedro and James K. Galbraith. 2000. "Constructing Long and Dense Time Series of Inequality Using the Theil Index." *Eastern Economic Journal* 26(1):61-74.

Conceição, Pedro, James K. Galbraith, and Peter Bradford. 2001. "The Theil Index in Sequences of Nested and Hierarchic Grouping Structures: Implications for the Measurement of Inequality Through Time, with Data Aggregated at Different Levels of Industrial Classification." *Eastern Economic Journal* 27(4):491-514.

Contreras, Dante and Sebastián Gallegos. 2007. "Descomponiendo la desigualdad salarial en América Latina: ¿Una década de cambios?" Serie estudios estadísticos y prospectivos No.59, CEPAL, Santiago, Chile.

Contreras, Dante, Osvaldo Larrañaga, Julie Litchfield, and Alberto Valdés. 2001. "Poverty and Income Distribution in Chile 1987-1998. New Evidence." *Cuadernos de Economía* 38(114):191-208.

Corbo, Vittorio and José A. Tessada. 2002. "Growth and Adjustment in Chile: A Look at the 1990s." in *Economic Growth: Sources, Trends, and Cycles*, edited by L. Norman and S. Raimundo. Santiago, Chile: Central Bank of Chile.

Cornia, Giovanni Andrea. 2011. "Economic Integration, Inequality and Growth: Latin America vs. the European economies in transition." DESA Working Paper No. 101, United Nations Department of Economic and Social Affairs.

Cowell, Frank A. 1980. "On the Structure of Additive Inequality Measures." *The Review of Economic Studies* 47(3):521-531.

—. 2006. "Theil, Inequality Indices and Decomposition." in *Dynamics of Inequality and Poverty (Research on Economic Inequality, Volume 13)*, edited by J. Creedy and G. Kalb: Emerald Group Publishing Limited, pp. 341 - 356.

—. 2009. *Measuring Inequality*: London School of Economics Perspectives in Economic Analysis series, published by Oxford University Press.

Cruces, Guillermo and Leonardo Gasparini. 2009a. "Desigualdad en Argentina. Una revision de la evidencia empirica." *Desarrollo Económico* 48(192):395-437.

—. 2009b. "Desigualdad en Argentina. Una revisión de la evidencia empírica (II) " *Desarrollo Económico* 49(193):3-29.

De Ferranti, David, Guillermo E. Perry, Francisco Ferreira, and Michael Walton. 2004. "Inequality in Latin America: Breaking with History?", The World Bank, Washington, D.C.

De Negri, João Alberto, Paulo Furtado de Castro, Natalia Ribeiro de Souza, and Jorge Saba Arbache. 2001. "Mercado Formal de Trabalho: Comparação entre os Microdados da RAIS e da PNAD " Working Paper No. 840, Instituto de Pesquisa Econômica Aplicada (IPEA), Brasília.

De Pablo, Juan Carlos. 1977. "Un análisis sectorial de la distribución funcional del ingreso." *Desarrollo Económico* 16(64):555-569.

Deininger, Klaus and Lyn Squire. 1996. "A New Data Set Measuring Income Inequality." *World Bank Economic Review* 10(3):565-591.

Díaz, Rodrigo and Patricio Meller. 2004. "Crecimiento Económico Regional en Chile: ¿Convergencia?" Working Paper Nº 180, Centro de Economía Aplicada, Universidad de Chile, Santiago, Chile.

Diéguez, Héctor L. and Alberto Petrecolla. 1974. "La distribución funcional del ingreso y el sistema previsional en la Argentina, 1950-1972." *Desarrollo Económico* 14(55):423-440.

Dirección General de Estadística y Censos. 2006. "Producto Bruto Geográfico de la Ciudad de Buenos Aires." Informe de Resultados No. 245, Ministerio de Hacienda, Gobierno de la Ciudad de Buenos Aires, Argentina.

—. 2008. "Producto Bruto Geográfico de la Ciudad de Buenos Aires." Report No. 373, Ministerio de Hacienda, Gobierno de la Ciudad de Buenos Aires, Argentina.

Dirección Nacional de Programación Macroeconómica. "Información Económica al Día: http://www.mecon.gov.ar/peconomica/basehome/infoeco.html." Ministerio de Economía y Finanzas Públicas, Buenos Aires, Argentina.

Dresdner, Jorge and Carlos Sanhueza. 2009. "Estimación de Series de Salarios Regionales en Chile." UdeC Working Paper No. 7, Universidad de Concepción (UdeC), Concepción, Chile.

Du Pin Calmon, Paulo, Pedro Conceição, and James K. Galbraith. 1999. "Inequality and Industrial Wage Change in Brazil." UTIP Working Paper No.12, University of Texas, Austin, Texas.

Du Pin Calmon, Paulo, Pedro Conceição, James K. Galbraith, Vidal Garza Cantú, and Abel Hibert. 2000. "The Evolution of Industrial Earnings Inequality in Mexico and Brazil." R*eview of development economics* 4(2):194-203.

ECLAC. 2010. "Time for Equality. Closing gaps, Opening trails." Economic Commission for Latin America and the Caribbean, Santiago, Chile.

Ferreira, Francisco H. G. and Ricardo Barros. 1999. "The Slippery Slope: Explaining the Increase in Extreme Poverty in Urban Brazil, 1976-1996." T*he Brazilian Review of Econometrics* 19(2):211-296.

Ferreira, Francisco H. G., Phillippe G. Leite, and Matthew Wai-Poi. 2007. "Trade liberalization, employment flows, and wage inequality in Brazil." Policy Research Working Paper No. 4108, The World Bank, Washington, D.C.

Ferreira, Francisco H.G. and Ricardo Barros. 2000. "Education and Income Distribution in Urban Brazil, 1976-1996." C*EPAL Review* 71:41-61.

Fields, Gary S. 2002. "Accounting for Income Inequality and its Change: A New Method, With Application to the Distribution of Earnings in the United States." Working Paper No. 265, Cornell University ILR School.

Frenkel, Roberto. 2002. "Argentina: A Decade of the Convertibility Regime." R*evista de Economia Política* 22(4):3-14.

Frenkel, Roberto and Martin González Rozada. 2000. "Balance-of-Payments Liberalization: Effects on Growth, Employment and Income in Argentina." CEPA Working Paper No. 14, Schwartz Center for Economic Policy Analysis, New School University.

Galbraith, James K. 1998. C*reated Unequal: The Crisis in American Pay. A Twentieth Century Fund Book,* New York: The Free Press.

—. 2009. "Inequality, Unemployment and Growth: New Measures for Old Controversies." J*ournal of Economic Inequality* 7(2):189-206.

Galbraith, James K. and Enrique Garcilazo. 2008. "Inequalities, Employment and Income Convergence in Europe: Evidence from Regional Data." UTIP Working Paper No. 52, The University of Texas at Austin, Austin, Texas.

Galbraith, James K. and Vidal Garza Cantú. 1999. "Grading the Performance of the Latin American Regimes 1970-1995." UTIP Working Paper No.10, The University of Texas, Austin, Texas.

Galbraith, James K. and Travis Hale. 2009. "The Evolution of Economic Inequality in the United States, 1969-2007." UTIP Working Paper No. 57, The University of Texas, Austin, Texas.

Galbraith, James K., Laura Spagnolo, and Daniel Munevar. 2008. "Inequidad Salarial en Cuba durante el Periodo Especial " A*mérica Latina Hoy* 48:109-138.

Galbraith, James K., Laura Spagnolo, and Sergio Pinto. 2007. "Economic Inequality and Political Power: A Comparative Analysis of Argentina and Brazil." B*usiness and Politics* 9(1).

Galbraith, James, Laura Spagnolo, and Sergio Pinto. 2006. "The Decline of Pay Inequality in Argentina and Brazil following the Crises and Retreat from the Neo-liberal Model." UTIP Working Paper No. 34, The University of Texas, Austin, Texas.

Galiani, Sebastian and Guido Porto. 2010. "Trends in Tariff Reforms and in the Structure of Wages." R*eview of Economics and Statistics* 92(3):482–494.

Galiani, Sebastian and Pablo Sanguinetti. 2003. "The impact of trade liberalization on wage inequality: evidence from Argentina." J*ournal of Development Economics* 72:497– 513.

Galindo, Arturo and Alejandro Izquierdo. 2002. "Interrupciones súbitas en los flujos de capitales y estrategias cambiarias en Latinoamérica." R*evista Asturiana de Economía* 24.

Ganuza, Enrique and Lance Taylor. 1998. "Macroeconomic Policy, Poverty, and Equality in Latin America and the Caribbean." Working Paper No. 6, Center for Economic Policy Analysis. New School for Social Research, New York.

Gasparini, Leonardo. 1999. "Un Análisis de la Distribución del Ingreso en la Argentina sobre la base de Descomposiciones." in L*a Distribución del Ingreso en la Argentina.* Buenos Aires: Fundación de Investigaciones Económicas Latinoamericanas.

—. 2003. "Argentina's Distributional Failure: The role of Integration and Public Policies." CEDLAS Working Paper No.1, Centro de Estudios Distributivos, Laborales y Sociales, Universidad Nacional de la Plata, Buenos Aires, Argentina.

Gasparini, Leonardo and Guillermo Cruces. 2008. "A Distribution in Motion: The Case of Argentina." Documento de Trabajo Nro. 78, Centro de Estudios Distributivos, Laborales y Sociales (CEDLAS), Universidad Nacional de la Plata, Argentina.

Gasparini, Leonardo, Guillermo Cruces, and Leopoldo Tornarolli. 2008. "Is Income Inequality in Latin America Falling?" in *XLIII Asociación Argentina de Economía Política.* Córdoba, Argentina.

—. 2009. "Recent trends in income inequality in Latin America." ECINEQ Working Paper No. 132.

Gasparini, Leonardo, Matias Horenstein, and Sergio Olivieri. 2006. "Economic Polarisation in Latin America and the Caribbean: What do Household Surveys Tell Us?", Documento de Trabajo Nro. 38, Centro de Estudios Distributivos, Laborales y Sociales (CEDLAS), Universidad Nacional de la Plata, Argentina.

Gasparini, Leonardo, Mariana Marchionni, and Walter Sosa Escudero. 2005. "Characterization of Inequality Changes through Microeconometric Decompositions: The Case of Greater Buenos Aires." in T*he Microeconomics of Income Distribution Dynamics in East Asia and Latin America,* edited by F. Bourguignon, F. H. G. Ferreira, and N. Lustig. New York: World Bank and Oxford University Press.

Gasparini, Leonardo and Leopoldo Tornarolli. 2009. "Informalidad laboral en America Latina y el Caribe: patrones y tendencias a partir de microdatos de encuestas de hogares." D*esarrollo Y Sociedad* 63:13-80.

Gavan, James. 1968. "Sobre la Distribución Funcional del Ingreso en Chile." C*uadernos de Economia-Latin American Journal of Economics* 5(15):34-48.

González-Rozada, Martín and Alicia Menendez. 2006. "Why Have Urban Poverty and Income Inequality Increased so Much? Argentina, 1991-2001." E*conomic Development and Cultural Change* 55(1):109-138.

Graña, Juan M., Damián Kennedy, Javier Lindenboim, and Carlos Pissaco. 2005. "La distribución funcional del ingreso en Argentina: incidencia de los precios relativos en la última década." in S*eptimo Congreso Nacional de Estudios del Trabajo.* Buenos Aires, Argentina: Asociación Argentina de Especialistas en Estudios del Trabajo.

Griffith-Jones, Stephany. 2000. "International Capital Flows to Latin America." Economic Reforms Series No. 55, ECLAC, Santiago, Chile.

Groisman, Fernando. 2003. "Devaluación educativa y segmentación en el mercado de trabajo del área metropolitana de Buenos Aires entre 1974 y 2000." E*studios del trabajo* 25:73–97.

—. 2008. "Efectos distributivos durante la fase expansiva de Argentina (2002-2007)." R*evista de la CEPAL* (96):201-220.

IBGE. 2009. "Produto Interno Bruto dos Municípios 2003-2007." Contas Nacionais No. 30, Instituto Brasileiro de Geografia e Estatística, Rio de Janeiro.

INDEC. 2003. "La nueva Encuesta Permanente de Hogares de Argentina." Instituto Nacional de Estadística y Censos (INDEC), Buenos Aires, Argentina.

Instituto Brasileiro de Geografia e Estatística, (IBGE). 2008. "Série PD153 – População de 10 ano ou mais idade, empregada, por categoría do emprego (trabalho principal)." Pesquisa Nacional por Amostra de Domicílios 1992/2007.

Instituto Nacional de Estadística y Censos (INDEC). 2006. "Generación del Ingreso e Insumo de Mano de Obra. Fuentes, métodos y estimaciones. Años 1993 – 2005."

Instituto Nacional de Estadísticas, INE. 2010. "Empleo Trismestral." Boletín Informativo del Instituto Nacional de Estadísticas No. 144, Santiago, Chile.

Juhn, Chinhui, Kevin M. Murphy, and Brooks Pierce. 1993. "Wage inequality and the rise in returns to skill." J*ournal of Political Economy* 101(3):410.

Kanbur, Ravi and Nora Lustig. 1999. "Why is Inequality Back on the Agenda?" in A*nnual Bank Conference on Development Economics, World Bank.* Washington, D.C.

Larraín Bascuñán, Felipe and Rodrigo M. Vergara. 2001. "La Transformación Económica de Chile." Santiago, Chile: Centro de Estudios Públicos.

Larrañaga, Osvaldo. 2001. "Distribución de Ingresos en Chile: 1958-2001." Working Paper No.178, Departamento de Economía, Universidad de Chile, Santiago, Chile.

—. 2009. "Inequality, Poverty and Social Policy: Recent Trends in Chile." OECD Social, Employment and Migration Working Papers, No. 85, OECD Publishing.

Larrañaga, Osvaldo and Juan Pablo Valenzuela. 2007. "Why Hasn't Inequality Changed in Chile Since 1990?" Working Paper No. 254, Departamento de Economía, Universidad de Chile, Santiago, Chile.

Larrañaga, Osvaldo and Humberto Vega Fernández. 2000. "Estudio sobre la Distribución del Ingreso: Estructura Funcional en 1987-96 y Proyecciones." Departamento de Economía. Universidad de Chile-Unidad de Estudios Prospectivos Mideplan, Santiago, Chile.

Lavagna, Roberto. 2003. " Cuestiones macroeconómicas." A*rchivos del Presente* 31:73-80.

Lefin, David. 2009. "II Región tiene un producto per cápita similar al de países desarrollados." in L*a Tercera.* Santiago, Chile.

Ley, Eduardo. 2010. "Exhaustible Resources and Fiscal Policy: Copper Mining in Zambia." ID Paper No. 77, The Centre for the Study of African Economies (CSAE) Conference 2010, Oxford.

Lindenboim, Javier. 2008. "Distribución Funcional del Ingreso, un tema olvidado que reclama atención." P*roblemas del Desarrollo. Revista Latinoamericana de Economía* 39(153):83-117.

Lindenboim, Javier, Juan M. Graña, and Damián Kennedy. 2005. "Distribución Funcional del Ingreso en Argentina. Ayer y Hoy." Working Paper N° 4, CEPED-IIE-FCE-UBA, Buenos Aires, Argentina.

Lo Tartaro, Diego. 2006. "El déficit consolidado de las provincias rondará los $11.500 millones este año." Instituto Argentino para el Desarrollo de las Economías Regionales (IADER), Buenos Aires, Argentina.

López-Calva, Luis Felipe and Nora Lustig. 2010. "Declining Inequality in Latin America: A Decade of Progress?": Brookings Institution Press.

Lora, Eduardo. 2001. "Structural Reforms in Latin America: What Has Been Reformed and How to Measure it." IDB Working Paper No. 466, Inter-American Development Bank, Washington, D.C.

Lustig, Nora. 2009. "Poverty, Inequality and the New Left in Latin America." Woodrow Wilson International Center for Scholars, Washington, D.C.

Lustig, Nora and Darryl McLeod. 2009. "Are Latin America's New Left Regimes Reducing Inequality Faster? Addendum to Poverty, Inequality and the New Left in Latin America." Woodrow Wilson International Center for Scholars, Washington, D.C.

Macdonald, Laura and Arne Ruckert. Fall 2010. "The post-neoliberal mix: new state practices in Latin America's big three." Canada Watch.

Macías, Osvaldo Jorge Mastrángelo, Marcia Miranda, José Luis Ruiz, Marcia Salinas, and Dagoberto Valenzuela. 2003. "The Chilean Pension System." Superintendency of Pension Fund Administrators, Santiago, Chile.

Marshall, Adriana. 2002. "Transformaciones en el empleo y la intervencion sindical en la industria: efectos sobre la desigualdad de salarios." Desarrollo Económico 42(166):211-230.

—. 2010. "Desigualdad salarial en la industria argentina: Discusión de las tendencias en 2003-2008." Documentos para Discusión No. 5, Instituto de Desarrollo Económico y Social (IDES), Buenos Aires, Argentina.

Maurizio, Roxana. 2007. "Macroeconomic regime, trade openness, unemployment and inequality. The Argentine Experience." Policy Perspective on Growth, Economic Structure and Poverty Reduction' Conference, IDEAS, Beijing.

Maurizio, Roxana 2001. "Demanda de trabajo, sobreeducación y distribución del ingreso." 5 Congreso Nacional de Estudios del Trabajo, Buenos Aires, Argentina.

MIDEPLAN. 2010a. "Glosario CASEN 2009." Ministerio de Planificación, Gobierno de Chile, Santiago, Chile.

—. 2010b. "Nuevas cifras de Distribución del Ingreso." O*nline. Available: http://www.mideplan.cl/casen2009/ingreso.php. Accessed: December 10, 2010.*

Ministerio de Trabajo Empleo y Seguridad Social, (MTEySS). 2009. "Teorías económicas y políticas públicas frente a la crisis global." Revista de Trabajo No. 7, Ministerio de Trabajo, Empleo y Seguridad Social, Buenos Aires, Argentina.

Ministério do Trabalho e Emprego, (MTE). 2010. "Registros Administrativos RAIS e CAGED." Brasília, Brazil.

Monsueto, Sandro Eduardo, Ana Flávia Machado, and André Braz Golgher. 2006. "Earning inequalities in Brazil: quantile regressions and the decomposition approach." C*EPAL Review* 90:169-187.

Monza, Alfredo. 1973. "La medición empírica de la distribución funcional del ingreso." D*esarrollo Económico* 13(50):315-332.

Morley, Samuel, A., Roberto Machado, and Stefano Pettinato. 1999. "Indexes of Structural Reform in Latin America." Serie Reformas Económicas No.12, Economic Commission for Latin America and the Caribbean (ECLAC), Santiago, Chile.

Narodowski, Patricio and Demian Panigo. 2010. "El nuevo modelo de desarrollo nacional y su impacto en la Provincia de Buenos Aires." Cuadernos de Economía No.75, Ministerio de Economía de la Provincia de Buenos Aires, La Plata, Buenos Aires.

Novick, Marta, Carlos Tomada, Mario Damill, Roberto Frenkel, and Roxana Maurizio. 2007. "In the wake of the crisis: Argentina's new economic and labour policy directions and their impact." Research Series 114, International Institute for Labour Studies of the International Labour Organization, Geneva, Switzerland.

Observatorio de Comercio Internacional de Buenos Aires. 2010. "Exportaciones de la Ciudad de Buenos Aires en el primer semestre de 2010." Report No. 8, Ciudad Autónoma de Buenos Aires, Argentina.

Observatorio de Empleo y Dinámica Empresarial (OEDE). "Series Estadísticas Disponibles:
http://www.trabajo.gov.ar/left/estadisticas/oede/estadisticas.asp."
Ministerio de Trabajo, Empleo y Seguridad Social de la Nación, Buenos Aires, Argentina.

Orsatti, Alvaro. 1983. "La nueva distribución funcional del ingreso en la Argentina " D*esarrollo Económico* 23(91):315-337.

Passicot Callier, Andrés. 1969. "Comentarios al Artículo "Sobre la Distribucion Funcional del Ingreso en Chile"." Cuentas Sociales de ODEPLAN, Santiago, Chile.

Pavcnik, Nina, Andreas Blom, Pinelopi Goldberg, and Norbert R. Schady. 2004. "Trade Liberalization and Industry Wage Structure: Evidence from Brazil." W*orld Bank Economic Review* 18(3):319-344.

Petrecolla, Diego. 1996. "Una Medida alternativa de la pobreza en el Gran Buenos Aires: 1989-1994." D*esarrollo Económico* 36(141):475-486.

Porto, Guido. 2006. "Using survey data to assess the distributional effects of trade policy." J*ournal of International Economics* 70(1):140-160.

Pyatt, Graham. 2003. "Development and the Distribution of Living Standards: A Critique of the Evolving Data Base." R*eview of Income and Wealth* 49(3):333-358.

RAIS. "Relação Anual de Informações Sociais" Available at http://www.mte.gov.br/rais/default.asp.

Robbins, Donald. 1994. "Relative wage structure in Chile, 1957-1992: changes in the structure of demand for schooling." E*studios de Economia* 21(9):49-78.

SAFP. "Superintendencia de Administradoras de Fondos de Pensiones" Available at http://www.spensiones.cl/safpstats/stats/.

Salvia, Agustín and Eduardo Donza. 1999. "Problemas de medición y sesgos de estimación derivados de la no respuesta a las preguntas de ingresos en la EPH (1990-1998)." E*studios del trabajo* 18.

Sánchez-Páramo, Carolina and Norbert Schady. 2003. "Off and running? Technology, trade and the rising demand for skilled workers in Latin America." Working Paper No. 3015, The World Bank, Washington, D.C.

Sanhueza Sánchez, Carlos. 2009. "Convergencia de Salarios entre las Regiones de Chile, en el Periodo 1994-2003." Magíster en Economía de Recursos Naturales, Universidad de Concepción.

Secretaría de Minería. 2009. "Minería en números." Ministerio de Planificacion Federal, Inversion Pública y Servicios, Buenos Aires, Argentina.

Shorrocks, Anthony F. 1980. "The Class of Additively Decomposable Inequality Measures." E*conometrica* 48(3):613-625.

—. 1984. "Inequality Decomposition by Population Subgroups." E*conometrica* 52(6):1369-1385.

Sistema Integrado Previsional Argentino (SIPA). 2009. Available at: http://www.safjp.gov.ar/principal.htm, Buenos Aires, Argentina.

Solimano, Andrés and Arístides Torche. 2007. "La Distribución del Ingreso en Chile 1987-2003: Análisis y Consideraciones de Política." Instituto de Economía, Pontificia Universidad de Chile (PUC), Santiago, Chile.

Sotomayor, Orlando J. 2004. "Education and Changes in Brazilian Wage Inequality, 1976-2001." I*ndustrial and Labor Relations Review* 58(1):94-111.

Spagnolo, Laura and Daniel Munevar. 2008. "After Years of (Economic) Solitude: Neoliberal Reforms and Trends in Manufacturing Sector Pay Inequality in Colombia." UTIP Working Paper No. 47, The University of Texas, Austin, Texas.

SUBDERE, MIDEPLAN, and INE. 2009. "Indice de Competitividad Regional 2008." Ministerio del Interior, Ministerio de Planificación, Instituto Nacional de Estadísticas, Gobierno de Chile, Santiago, Chile.

Superintendencia de Administradoras de Fondos de Pensiones. 1995-2010. "Series Estadísticas: Cotizantes e Ingreso Imponible Promedio por Actividada Económica y por Región."

Székely, Miguel and Marianne Hilgert. 1999. "What's Behind the Inequality We Measure: an Investigation Using Latin American Data." IDB Working Paper No. 409, Inter-American Development Bank, Washington, D.C.

The World Bank. 2005. "Argentina - A la busqueda de un crecimiento sostenido con equidad social: observaciones sobre el crecimiento, la desigualdad y la pobreza." Report No. 32553-AR, The World Bank, Washington, D.C.

Theil, Henri. 1967. E*conomics and Information Theory,* Chicago: Rand McNally and Company.

Torche, Florencia. 2005. "Unequal but Fluid: Social Mobility in Chile in Comparative Perspective." A*merican Sociological Review* 70(3):422-450.

Tramón, María Loreto and Jorge Dresdner. 2004. "¿Convergen los Salarios Regionales en Chile?" E*conomía y Administración, Universidad de Concepción* XLI(62):7-31.

UNCTAD. 2007. "World Investment Report 2007: Transnational Corporations Extractive Industries and Development." United Nations Conference on Trade and Development, Geneva, Switzerland.

UNU-WIDER. "World Income Inequality Database: User Guide and Data Sources." World Institute for Development Economics Research of the United Nations University, Helsinki, Finland.

—. 2007. "WIID2b Revision notes." World Institute for Development Economics Research of the United Nations University, Helsinki, Finland.

UTIP. "University of Texas Inequality Project" Available at: http://utip.gov.utexas.edu.

Williamson, John. 1990. "What Washington Means by Policy Reform." in L*atin American Adjustment: How Much Has Happened?*, edited by J. Williamson. Washington, D.C.: Peterson Institute for International Economics.